COAL AGE

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What is a Mining Engineer?

OCCASIONALLY a mining engineer manages to get control of a modest bank account by capitalizing some of the information he has gathered from various sources at various times as to values of undeveloped mineral tracts. On such occasions, however, some employer or past employer is certain to come forward to insist that the engineer betrayed a trust in using information that he was supposed to acquire for the benefit of anyone who might wish to use it except himself.

A MINING ENGINEER *is an individual who cherishes hopes that some day—the day when he will be able to call himself a superintendent or consulting engineer—he may be able to earn as much money per month as does the average coal digger or other indispensable personages connected with the mining industry.*

If an executive officer absorbs general information given to him by his engineer and then passes it on to a son or other relative having no connection with the company and allows him to make the most of it, his directors may censure him on the ground that he is giving too much attention to outside business, but the director hasn't yet been born who would class such procedure as a betrayal of trust.

And the reason is not far to seek—directors do not expect employees to mortgage themselves body and soul when they seek employment. Truth is, directors are not fond of defining too closely the rights of individuals in the employ of others, because directors realize that they, too, are only individuals in the eyes of the law.

Mining engineers are considered the logical referees in all cases where disputes arise between land owners and leasing companies, and their decisions are seldom questioned even though one of the parties to the dispute is the employer of the engineer.

In times of labor troubles mining engineers are pressed into service as mine guards, and in slack times, when they begin to find enough idle time to brush up on the theory of their profession, they are permitted to assist the clerical forces—mining engineers are so good at figures, you see.

But in times of extreme prosperity, when dividends begin to pile up and stock values change daily, many coal companies conveniently forget that the mining engineer might be willing to share in the general improvement and do it as uncomplainingly as he shouldered the gun for guard duty.

Possibly he might be willing to use part of the easy money that came his way to prepare one of his sons to follow in his footsteps, even though up to the present writing a mining engineer, son of a mining engineer, is almost a curiosity.

Ideas and Suggestions

Day-Labor Cost of Operating Coal Mines

By George S. Brackett*

The price paid the miners and loaders for placing the coal on the mine car at the working face is the largest single item in the costs of operating bituminous coal mines. The next largest is the day-labor expense. The former is practically fixed for each region and does not vary. Every ton of coal produced costs just so much, and regardless of the management it remains the same. It is not subject to adjustment by the ability of the superintendent or foreman. It is entirely eliminated from any discussion as to methods of reducing the cost of production, being an item beyond the management's power to change. The royalty charges are also fixed and not amenable to adjustment. The supply account is much the same from month to month, as the necessary material must be purchased as needed. Extra expenditures for material may be postponed temporarily, but in the long run from year to year little change can be made in the supplies used at the mine.

The superintendent's ability to handle and operate a mine successfully hinges principally on the one item—the day-labor cost of operation. This he can reduce or raise at will within certain limits. He can improve the underground conditions while better market prices rule or reduce the amount of labor done during dull times. The success or failure of the mine depends largely on this labor cost. It is subject to more variation than any other cost item on account of its being dependent almost entirely upon the individual ability of the management, and this quality has as many variations as there are individuals.

The question of what this cost should be is much disputed, and many estimates are made based on any one or group of mines. Each superintendent knows what he is doing himself, but there is more or less reticence in exchanging figures with neighboring mines.

Establishing an Average

An average value for this cost of labor is important, and the impracticability of obtaining average figures over large sections for periods of considerable time has led to much misunderstanding and criticism of the local management. The average cost is not what, in the opinion of a few men, the work should be done for, nor is it a few months' test run. It is a figure covering a long period of time, allowing for considerable mining difficulties and embodying some allowance for the labor necessary to the general maintenance and repairs of the mine and plant. It should include a wide variety of conditions, both favorable and adverse. Granting that this average can be established, the benefit to the operators is evident.

The accompanying diagram is compiled from published figures of 454 mines in Pennsylvania and West Virginia. The number of mines entering into the average is so great that any inaccuracy that may occur in the report from any one mine would be inappreciable in the result. Any temporary conditions such as an unusually high or low cost simply influence the result in making the figures represent average conditions through long-time operation. Also mines were selected which worked over 230 days in the year, so that the estimate may be taken as of mines producing their capacity and maintaining their equipment and mine conditions.

The foundation of the diagram is the mean force of day employees requisite at the mine for a period of one year; and the average daily shipments are based on the annual production. Some mines included in the average may be going through that period of reconstruction and betterment that is advisable periodically. Others may be using every means of economy. In fact, the figures may be taken as being very fair operating expenses covering a considerable period of time and variable conditions. They do not represent the cheapest mine nor the most expensive. Certain mines must necessarily call for higher labor costs than others, but these conditions are known, and any such allowance made to fit the individual case. Although the figures include an average amount of rock work they do not represent exceptions; and they represent the average haul over the large number of mines.

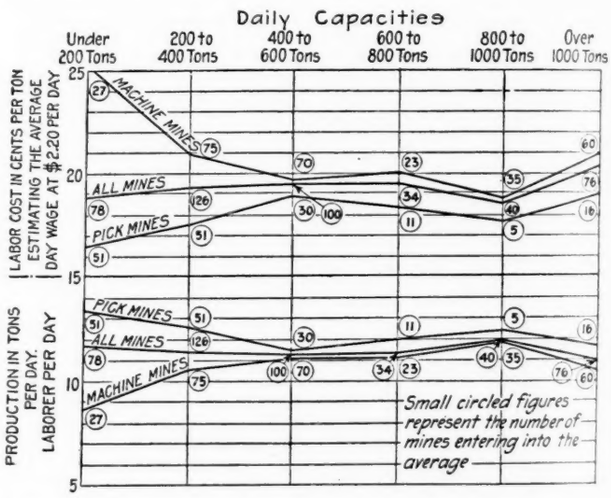

DIAGRAM SHOWING LABOR COST OF PENNSYLVANIA AND WEST VIRGINIA COAL MINES

Basis of the Calculation

The basis of the diagram is the number of tons output per day-employee or day-laborer per working day. It does not take into consideration any extra-time track men, drivers and others who may be working while the mine is idle. It is customary for some day-men to work in idle time on something that may be then more easily done. Although this is a small percentage of the regular

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day-labor expenses it is something, and it would accordingly increase the cost given in the diagram. In explanation of the chart, it may be added that the force of miners or loaders necessary to produce the tonnage is not figured in the day-labor cost, the coal being loaded on the mine car at the working face by the requisite number of miners. The coal is hauled by drivers, track laid and repaired by trackmen, doors opened by trappers; these, with the motormen, brakemen, dumpers, trimmers, car shifters and all other day-labor necessary to move this tonnage from the working face to the loaded railroad car, are represented on the diagram in the "Production in Tons per Day-Laborer per Day" and "Labor Cost in Cents per Ton, Estimating the Average Day Wage at $2.20 per Day."

Calculating an Average Cost per Ton

Firebosses are included when employed, also shopmen and carpenters; but not the superintendent or mine foreman or the mine-office force. It is simply the bare day-labor cost. The cost per ton is derived from the tons per day-man per day. The greater the tonnage the less the cost. The averages given in the lower half of the diagram show that the production per day-man runs from 8.7 tons for the low-capacity machine mines up to 13.4 tons for the low-capacity pick mines. These are the extremes in the averages.

To reduce these figures to cents per ton, an average day wage throughout the industry must be assumed. This average varies in different regions, and the upper half of the diagram may have to be readjusted to a small extent to fit the prevailing wage scale. Curiously the average production per day-man per day remains practically unchanged throughout many thicknesses and characters of coal—for the central Pennsylvania thin steam coals, western Pennsylvania thick gas and coking coals, thick steam coals of southern West Virginia and the thick and thin gas coals of central and northern West Virginia.

If any variation from this is to be noted it is in a little greater efficiency in the regions where the higher wage rates are in effect. For this reason a moderate average day rate was established; namely, $2.20 per day—little higher than the existing average in the low-rate regions and lower than those existing in western Pennsylvania. Considering this, I doubt very much if the costs per ton shown on the diagram can be changed materially for a wide range of mining conditions and wage rates throughout the bituminous coal regions.

Great Variation in Production

There is an almost inexplicable variation in the production per day-laborer per day when individual mines are considered, extreme cases running from 20 tons down to 3 tons. This indicates some confusion in this mine-labor item and the lack of any well-founded base for what this cost really should be.

It will be noticed that 51 pick mines with a capacity of less than 200 tons daily were operated with a labor cost of 16.6c. per ton—the cheapest group of mines. The interpretation is that these mines are so small and simple in their organization and so few men are employed that it is almost impossible to blunder in their operation. The only explanation advanced as to the rise in costs in pick mines up to 400 or 600 tons capacity is that these mines outgrow the crude management of the smaller mines up to that point; and from there up to the 1000-ton mark the more experienced management is in evidence.

Small capacity machine mines are a failure, as the cost of the power house and appliances are prohibitive for such small tonnages, and the operating costs of these mines decline generally up to 1000-ton capacity. There is little variation in this decline, as their equipment calls for experienced men in the start.

The reason for the increase in cost of all mines over 1000-ton capacity can only be speculation, but the evidence points to their being too large for almost any human being to exercise the proper supervision. Large mines are almost always equipped with the most modern labor-saving appliances, and their labor costs should be correspondingly less.

Temporary Center Post

The majority of accidents in the bituminous mines of Pennsylvania occur from falls of roof at the working faces. This fact has led to devising means whereby the danger at these places might be reduced. About a year ago the state inspectors having charge of the mines in the coke region decided after much investigation, to enforce the placing of a temporary center post at the working face of all places, regardless of whether the apparent condition of the sustaining roof appeared to require it or not.

Instructions to this effect were sent to all the operators and met with but little opposition. The inspectors did not claim that the center post was necessary at every face and admitted that in many places it appeared ridiculous to require it; but they did maintain, and rightly, that there should be no exception. It is well known that where the roof is naturally bad it is impossible always to judge just how safe the roof really is. Places that appear almost absolutely safe are sometimes the most dangerous.

It was to guard against these unseen as well as the known dangers that made the placing of the center post imperative in *all* places, in the judgment of these inspectors.

By this method a post is set in the center of the place within a foot or two of the face, by the miner before he begins to dig or load coal. As he advances in his work during the day, he will set another post if the face advances more than 3 ft. from the first post. In this manner the workman is always protected from falls of roof. The cost is small, as the post, being only temporary, can be set in a few minutes by the miner, and may be used time after time.

At one group of mines where the roof is very treacherous it is known that several accidents have been prevented in the last year through this precaution, and there were probably many more of which we do not know.

One of the inspectors is authority for the statement that the setting of a center post has reduced his accidents fully 40 per cent. All of the operators agree that this is one of the best orders put in force in late years, and this region will show a decrease in fatalities at the working faces in the next report.

Mining With a Conveyor System

By J. F. K. Brown*

SYNOPSIS—By installing 300-ft. conveyors and changing the general plan of operation of the mine, not only was mining rendered more safe, but the output was increased and the costs lowered.

The method of operation by conveyor herein described has been in use in a number of collieries belonging to a company working some comparatively thin measures in one of the coal fields in Scotland, and has proved its success and applicability through a period of at least 10 years. In some respects the method adopted was unusual in that while conveyors are in operation by themselves no coal-cutters are employed, undercutting being done by hand. Present-day practice always considers conveyor work an adjunct to machine mining; but here is a case of conveyor practice by itself. Another distinctive feature is that the opening and development of the mine for additional faces, as well as running the usual long-wall faces with the conveyor, are being done with a conveyor wall.

The coal seam on the average is 3 ft. 9 in. thick, but owing to the presence of stone bands is rather broken up, a correct section being as shown in the accompanying drawing. This means that after removing 31 in. of coal there remains to be disposed of somewhere about 14 in. of stone. The thick stone parting near the bottom of the coal is a yellow-white sandstone that breaks in flat squares, eminently suited for building the road pillars in longwall working.

The roof, which is an important factor in any mine's success, and particularly so in this case, consists of 10 to 12 in. of a strong "bind" (shale), above which is at least 5 ft. of a "mealy" soft "bleas"—also a local term for a shale—which possesses no adhesive powers of its own, and invariably flows into the workings wherever the shale immediately below it gives way.

Above this "mealy" shale is a thick bed of a heavy blocky sandstone. This naturally exerts a considerable downward pressure through the fine shale and on the "bind," which forms the only stiff parting in the roof, unless the whole 5 ft. of the "bleas" was taken down up to the sandstone above. To do this made too high a working, and proved too costly to practice; consequently efforts were always made to keep the "bind" unbroken.

In working under the old system, "dooks," or "deeps," were driven direct to the dip, the inclination being 8 deg. These "dooks" were driven in the solid coal, with pillars turned off every 150 ft. on the dip and 60 ft. on the level course. Every 300 ft. levels were broken off right and left, and a longwall face commenced two pillar lengths from the center deep, in a fan-shaped fashion, which as it opened out gradually edged uphill until its upper corner worked along the waste of the level above, and the face stretched from one level to another.

In driving the "deeps" three roads were allowed—one for haulage and intake air current while the two on either side where needed for return air. In order to operate the longwall faces at low cost, slants were driven uphill from the lowest level, and from the slant levels parallels to the main bottom level turned into the coal face, these being a distance of 40 ft. apart.

Every 200 ft. along the bottom level a fresh slant would be commenced, the object being to cut off the continually lengthening tramming levels and so provide a shorter haul to the level below, whence horse haulage conveyed the coal to the "deep."

As the working was only 45 in. high, it was necessary in all cases to "brush" the roof every night on each face 4 or 5 ft., and sometimes back-brushing 70 or 80 ft. behind the face could not be avoided in the levels. In some cases also it was necessary to brush slants owing to the rapid sinking of sandstone rock after the "bind" was once broken. Naturally, this brushing had to be carried up to the sandstone above the coal, and as much of the material thus brought down was fine and "crumbly," it had to be hoisted to the surface and disposed of there, all of which spelled loss in capital letters.

The building of the needed pack walls was done with the "bind" from the road heads, the stone from the seam itself, and partly from the sandstone taken down in back brushing. It was found by practice that this way of setting out working in semicircular fashion amounted practically to an invitation to the roof to fall in heavily in the center, where the lines of pressure converged.

By This Method the Roadhead Was Unsafe

In this method of operating the seam the "bind" was fractured in the regular course of working, and in such a manner as to create a series of parallel breaks running sometimes across the strike of the coal bed, or at any angle thereto. These breaks had a tendency to extend in advance of the coal, rendering the roadhead, unless special precautions were taken, an unsafe working place in comparison with the rest of the face.

Possibly owing to the dip and the nature of the overhead strata, there was also noticed a decided "creep" of the roof downhill, and in the course of a few weeks the rise side of each of the levels would start to press out the "mealy" shale, necessitating constant cleaning of the road. This also created trouble due to large holes or caves being left, which had afterward to be supported with fresh packing or timber. In short, troubles from the roof were constantly recurring, resulting in excessive costs.

Under these circumstances the officers in charge decided to experiment in the introduction of conveyors. With these in operation they expected to be better able to control the roof, not through the actual installation of this or any other machine, but through the regularity of working imposed by the fresh conditions introduced by the conveyor's advent.

The coal was still cut by hand. The chief idea of the introduction of the conveyor was to secure a better, safer and more easily handled working section, which would improve the speed of extraction and reduce the cost, mainly through a considerable reduction in the number of dead-work men in each section.

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During the ordinary longwall methods of working the following men were employed in the section: Miners, 14; brushers, 7; trackmen, 2; timbermen, 3. The output was 45 tons.

The miners trammed their own coal to the main level. In the layout of the workings for the conveyor there was little actual difference in the direction of development. The faces still extended across the strike; but in place of the three parallel deeps a longwall face was laid out at an angle between the dip and strike, so that the left-hand end was the most advanced, which allowed the coal and water to gravitate to one point. The driving and formation of pillars were thus dispensed with, and the longwall system of extraction became a developing system as well.

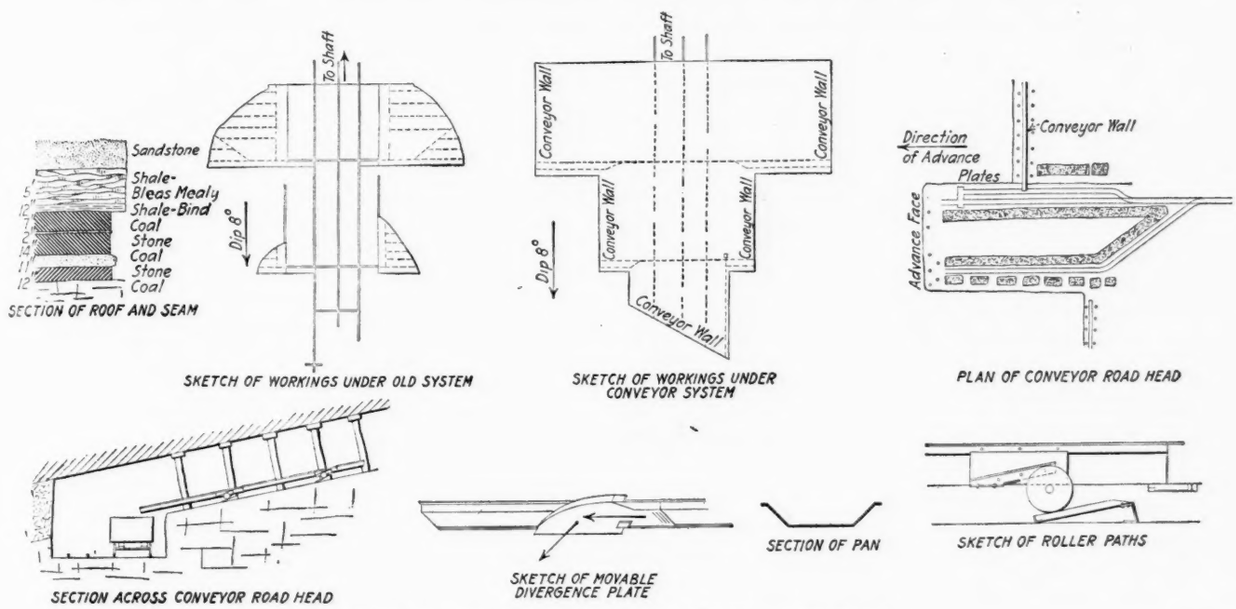
Levels were laid out every 300 ft., and those lower down the deep, being started at a later date, were naturally behind the others, a distance that varied with the speed of travel in the advancing face.

Formerly seven or eight roads were used in the waste in each section after the coal had been extracted, but in the new system only two roads were so maintained—the main working haulage level and one other a distance of 40 to 45 ft. below it. To reach the latter, short angle deeps or slopes were driven at frequent intervals, each slope being superseded by a fresh one; but special care was taken to arrange that no part of this bottom road was cut off or abandoned unless the face from the level above was in advance of the portion thus cut off. Instead of building the walls on the down side of this level in a continuous wall, spaces were left every 10 ft. or thereabout, the length of the pack being taken along the face rather than along the road.

Bottom Road Is Made a "Safety Valve"

The object of driving this bottom road was solely for the purpose of obtaining a "safety valve" for roof pressure. As already stated, the roof had a decided tendency to creep downhill, and since with the conveyor working the roof "bind" was not broken at all, except by its own weight back in the waste, it was found that this movement downhill was, if anything, increased. In order therefore to provide some space into which the pressure of the roof could exert itself without causing damage to the main level, this second level was driven, and with well-built pack walls on the main level, the roof rode over it, to break in the level below.

It might naturally be inferred that the lowest level should have been the haulage road, since otherwise coal would have to be raised to the road above. In practice it was found that the cost of constantly repairing the roof and floor of the lower level when used as the haulage road was exceptionally heavy, and the idea was then adopted of moving the main road to a level higher up and allowing the roof pressure to exhaust itself into the old road. This arrangement worked satisfactorily. The extra cost of lifting the few tons of coal extracted from the face below to the level of the main road was more than compensated for by the lesser upkeep of the haulage road.



SOME OF THE DETAILS OF CONVEYOR OPERATION

All timber, tools or other material needed for the men of the lower section is brought in by the main level of the section above, and through this lower level and the opening in the pack wall, is passed into the top of the conveyor, and hence down to the man or men requiring it. This saves considerable handling and hauling of material and supplies up a long conveyor face, and is an improvement over the old method of hauling timber to the face.

Each conveyor face is approximately 300 ft. long, at right angles to the strike, and consequently parallel to the dip and rise. The top of each face abuts on the lower waste side of the level above, at a distance of not more than 100 ft. back from the upper conveyor. Each section works in conjunction with the other, and is kept back or advanced so that this distance is maintained.

The stretch of face that is in advance of the conveyor line is worked as a two-roaded longwall section by hand to keep ahead of the conveyor, and is double-shifted. Pack walls in the conveyor face are built only on the

top side of the main haulage level and in the advance face. On the whole length of the conveyor face no stone is built into position. The rock from the seam is cast back, but is not specially built into packs.

Instead a regular system of face timbering, that must be strictly adhered to, is in vogue. In this method props are set in line and at regular spacing up and across the face, the actual distance being determined by experience. This is maintained irrespective of the roof breaks, or any irregularity in the roof. Under the old system, patches of bad roof developed, but under the new arrangement, these seldom appear, and where they do, they are attended to not by putting the regular system out of line but by the addition of extra timber.

The object of this regular propping is to obtain and hold control of the roof. This has been successfully done, in a manner that could not be attempted before, and which was only made possible by the straight lines of the conveyor face. When the ordinary longwall working was in operation, the pressure of the roof was upheld upon a series of solid packs. This caused the pressure to exert itself in several directions simultaneously into the waste spaces, into the roads, into the opening between the coal and the pack walls, etc. These spaces were unequal in size and area, the supporting points were various distances apart, and so the pressure was unequally distributed, which in turn developed lines of force that ran apparently in any direction and were not, nor could they be, intelligently directed.

In the conveyor face, owing to the long stretch of free roof available, these lines of force are controlled and directed by the regular propping, and the result is the overflowing of the roof pressure in places designed for it—namely, the lower level and the waste space left behind the coal—and not into the roads and the actual working face where falls of roof can be well dispensed with.

The timber used at the conveyor is drawn as regularly as the conveyor is shifted, and as progress is more rapid than under the old system, the roof does not need to stand so long before the men operate under fresh cover. The setting of the props in a straight line, using timber pointed on the top, produces a "line of break" parallel to the face, and at each succeeding setting of the props the roof breaks at that point and falls into the waste, while the resulting pressure from the overhanging and supported piece has a beneficial effect on the breaking out of the coal. It is a fact proved in practice that this break can be accurately regulated so as to produce just the right pressure on the face of the coal.

Floor Is Lifted Instead of Brushing the Roof

At the bottom of the conveyor, or conveyor head, the layout of the roads is as shown in the sketch, and instead of the roof being broken to get the needed height the floor is lifted. The end of the conveyor projects over the roadway from the bottom of the seam, and is continually discharging into cars placed underneath it.

The amount of bottom that has to be lifted depends on the height of the cars in use; in this case 30 in. It must be lifted the full width of the double road. This will be understood when it is considered that the tonnage at this one point is 65, and that it is being delivered at a regular rate into cars, the arrival of which is intermittent. A double road is therefore necessary, both for storage purposes and to provide a passby for the empty and loaded cars. Horse haulage has been adopted from the conveyor head to the rope haulage in the "deep."

In the operation of the conveyor face the number of men employed was somewhat as follows: Miners, 12; conveyor attendants, 5 per night; deadwork men, 2; timbermen are included with conveyor attendants.

Output, 55 Tons

In arranging the conveyor the machine is set up parallel to the line of the coal, a foot or so therefrom. A certain length of the seam is allotted to each miner, who commences at the top end of his particular length, with a breaking-in shot, if that is required. He afterward works downhill, loading out and breaking down with the conveyor operating past him, on his right- or left-hand side, but not at his back. On the 300-ft. face 12 men were at work regularly, this giving a space of 43 ft. to each man and a production per day of 55 tons.

Timber, tools and supplies come from the level above, and run down the conveyor to the man requiring them. Loading is continuous and from any point. Contrary to hand-mining practice, there has been no excessive loading periods. As a rule, and in this particular colliery, the "getting" on the whole length of the face is by contract. Otherwise it is only by measurement that each man's tonnage can be ascertained. Contracting puts each face output in the hands of one man, and the number of cars from each section can easily be reckoned at the haulage end by the usual means.

In this mine there are in all nine faces almost exactly similar. A feeling of friendly rivalry was introduced between the operators of the various faces, and at some periods of the year a bonus was paid the contractor who successfully extracted the greatest tonnage in any one fortnight. Generally speaking, the men welcomed the change from the old method to the new one. Contracting also was popular and satisfactory to both men and company. The men, after they had experience with the conveyor, were eager applicants for a contract, and the company had less overseeing work to do.

Shaking Conveyor Is Employed

The conveyor in use is of the shaking type, and has been adapted from continental practice. The height from the floor to the edge of the pan is only 9 in. This means that the workman is required to raise the coal only slightly over this height, instead of a former 29 in., which accounts for more work with decreased effort. The width is only 18 in., and this allows of the distance from coal face to waste line of props being kept at a minimum.

As shown, the conveyor rocks back and forth on rollers working in specially arranged paths. These are so designed as to cause the machine to fall sharply at the end of the forward stroke, whereby the motion imparted to the coal is continued in the material itself, while the conveyor draws back for the next stroke. The number of strokes is approximately 60 per minute, and the regulation of their length is an important feature in the design affecting the output and being influenced by the grade. In this case the grade is considerably in favor of the coal.

The principal dimensions of the driving engine are as follows: Horsepower of engine, 12; air consumption at

60 strokes per min. and 60 lb. pressure, 18 cu.ft.; stroke of engine, 5 in.; diameter of cylinder, 7 in.; weight of engine, 572 lb.

The theory of the machine is exactly that of a shaking screen. Movable sides are provided that can be taken out and placed across the conveyor, thus acting as chutes for the divergence of the coal or other material from the traveling pan. This has proved useful on not a few occasions, as any useless material can be readily shelved off the conveyor at any convenient point without the necessity of removing it by hand or loading it into cars at the foot, for disposal elsewhere.

The conveyor pan is built in 6-ft. sections which are easy to handle in confined spaces and simple to put together.

The engine, driven by compressed air, is a simple, plain, air cylinder, with broad bed-plate, which may be bolted to planks, which are in turn wedged against the roof by timber. The total width is 18 in., and the length 24 in. Connection to the conveyor is through a lever action and rigid attachment, the cylinder being placed at right angles to the line of the conveyor.

The pack walls on the top side of the driving road are uniformly built in line, 2 ft. or so back from the edge, this space being utilized for the engine. Air is furnished from a power-driven air compressor that stands in a little recess in the side of the road. The principal dimensions are as follows: Horsepower, 15; r.p.m., 960; amperes, 16.5; voltage, 500; cycles, 50; air pipe, 1½ in.; cylinders, 4; strokes per min., air cylinders, 480; pressure, 70 lb.; space occupied, 5 ft. 6 in. by 3 ft. 5 in. The air is passed through an 18-ft. hose to the air cylinder of the conveyor.

On the whole this arrangement has proved simple and reliable. The air cylinder is easily moved and held in position, while the air compressor may be shifted when the full length of hose is run out. The compressor runs on a bogie fitted with wheels to the gage of the road, and can, if desired, be placed in advance of the conveyor in the road driven ahead.

Rate of Advance Was Increased

The rate of advance changed from 160 ft. in six months under the old system to 270 ft. over the same period under the conveyor system. This is not remarkable compared to machine working advances, but it represents a considerably increased rate of extraction for handwork. The operation of each face in the colliery is regular and at the same rate, the only determining factor being the number of men employed.

Some extra organization is needed with such a conveyor face, in that it is necessary to see that the face is maintained in a straight line. This implies that it must be stripped every second or third day, depending on the rate of working from top to bottom. Otherwise there is left a "nose" of coal that interferes with the lining up of the conveyor when the time comes for shifting it. This coal has to be removed at the cost of extra labor and time.

Shifting of the conveyor takes place every second night, so as to get under the fresh rock as soon as possible; but this is governed by the rate of cutting and loading. The air engine is moved at the same time as the conveyor, but the compressor only when the length of hose is reached. The operation of shifting is accomplished by a night force of eight, who also shift the compressor when necessary and set all timber required.

Getting the conveyor ready for removal is done by unbolting the sections, after which whatever timber is to be moved is drawn section length, by section length, each section being in turn inserted in the space thus made, until the whole conveyor roughly occupies the new line, when the whole is again reconnected. The timber is again set section by section behind the conveyor, while the outside line, next the waste, now no longer required, is drawn. The original setting of the timber is done by the miners when working downhill in loading out the coal, the conveyor serving as the measurement line.

The opening-out section to the dip is operated at an angle to both the strike and dip and rise with the intention of causing any water made to gravitate to one point where it can be easily handled by a pump. Should the conveyor be placed at too flat an angle with the strike, it is apt to crawl up on the miners and has to be strongly stayed in position. There is also the trouble of the coal running entirely on one side of the conveyor and dropping over, if working extra full.

The exact angle at which the best and quickest work is performed is really a matter of experiment. There is no difference between the opening-out section and the other conveyor section in the actual operation method. It is true there are two fast ends, and consequently the coal cost is a fraction more than from the other faces; but it is much less than the rate formerly paid per ton for driving "deeps."

As this deep face proceeds it opens out on either side fresh conveyor faces that are ready to commence operations across the dip and rise without preliminary straightening or other work that would have been needed had the old policy been still in operation. The roof pressure is of course much greater in and about the center road; but once the roof has settled there is absolutely no further trouble.

Costs Were Decreased

A comparison of the costs of operation and performance accomplished by the old and the new systems has worked out much as follows:

	Hand Operation	Conveyor Operation
Tons, per man	3.2	4.6
Length of face	300 ft.	300 ft.
Tons, per section	45	55
Length of face, per man	43 ft.	40-50 ft.
Number of miners	14	12
Number of deadwork men	12	2
Number of conveyor men	...	1
Shifting conveyor	.. (Average per night)	4
Number of roads to maintain	7	2
Tons per road	6.4 Main level Bottom "	49.00 6.00
Time stripping	9 hr.	9 hr.
Distance bottom level in advance	....	40 ft.
Costs		
Cutting, Shooting, Loading	0.72	0.72
Brushing	0.41	(Done by squad shifting conveyor.)
Maintaining roads	0.08	0.08
Tramming	(Included with shooting and loading)	(Included for lower level in tonnage rate)
Shifting conveyor	....	.15
Operating conveyor	....	.03
	$1.21	$0.98

It will be seen that the saving in cost finally effected is entirely due to the elimination of roof troubles, which the conveyor system made possible. There are now installed 10 conveyor faces, and because of their success they are likely to be extended.

Coal Holdings of the New York Central R.R.

A phase of the New York Central's investments one hears little enough about is its coal-land holdings and developments. Few, if any, of these have reached the stage of paying direct money returns as dividends, and probably they will not for an indefinite time to come. The reason is that they have been acquired almost solely with a view to creating a fuel reserve for the Vanderbilt system. Cost of locomotive fuel or of power-house fuel, as the case may be, is becoming a more serious problem to most railroads every year. Apparently the Vanderbilt roads have solved it as far as it can be solved.

Among the investments of the Central is all the stock, $825,000, of the Clearfield Bituminous Coal Corporation, owning and controlling coal lands and mines in central Pennsylvania. It owns in fee 47,000 acres and leases 12,000 acres, besides owning the equity in various tracts aggregating about 80,000 acres subject to underlying mortgages. The corporation produces no commercial coal, its entire present output being taken by the Central and affiliated roads. The company does not wholly meet its fixed charges, but it is the means of assuring the eastern half of the system an ample fuel supply at reasonable prices.

West Virginia Properties

In 1905 the Pittsburgh & Lake Erie reached into the break-up of the ambitious Gould project for an eastern seaboard system and pulled out the remaining properties of the Little Kanawha Syndicate at a price approximating $8,600,000. These consisted of a variety of scattered short railroads in West Virginia and some really valuable coal lands. Subsequently the Pittsburgh & Lake Erie sold a half interest in these properties, equally divided between the Pennsylvania and the Baltimore & Ohio, practically at cost. The Monongahela R.R., which connects with the Pittsburgh & Lake Erie and is owned jointly by it and the Pennsylvania, has been extended south to the Pennsylvania-West Virginia state line. From that point the construction of the Buckhannon & Northern, one of the syndicate roads, has lately been completed to Rivesville, W. Va., and in the Fairmont district.

By means of the joint route just described and trackage over the Baltimore & Ohio the Vanderbilt lines and the Pennsylvania reach a tract of 57,000 acres of coal land about to be opened up. For portions of this tract the owners have been offered a price per acre that represents a valuation of $12,000,000 on the whole. The three big systems are working in harmony to divide the traffic here created, with the lion's share to the chief owner, the Central's subsidiary.

Sources of Coal Further West

Aside from the Fairmont tract, the syndicate holdings include at least one other West Virginia coal area of importance, besides odds and ends of railroad and right-of-way which will presumably become useful as the industrial development of West Virginia proceeds. In comparison with the value of the coal and that of a fuel supply, the carrying charges on the original investment are insignificant.

Further west there are additional coal reserves, the Big Four having recently acquired 37,000 acres and the Lake Shore 74,573 acres of coal lands in Illinois. The Lake Shore's purchase involved an expenditure of $2,399,659. Here, as elsewhere, the primary object of the acquisition is the assurance of an adequate fuel supply, though commercial coal is being produced from some of these properties.

Everyone knows that the New York Central lines are not largely carriers of coal; that is, coal is under 30 per cent. of their tonnage as against 50 per cent. to 60 per cent. for such coalers as the Baltimore & Ohio, Pennsylvania and Norfolk & Western. But everyone does not know that they have a firm foothold in the three most important coal fields in the country, with something like 300,000 acres of coal lands owned or under lease. Possibly they, with other railroads, will some day run up against an amended and fortified commodities clause, so far as the commercial working of these fields is concerned. But by that time the location of mine branches will presumably have assured them the traffic from these holdings or parts thereof under other ownership. It is not likely that they will be prevented from exercising the ordinary business prudence of retaining a stock of unmined locomotive fuel.—"Boston News Bureau."

Coal Resources and Imports of Chile

Coal mining in Chile has shown a steady development in the past 10 years, says Consul General Leo J. Keena in *Commerce Reports*. In 1904, 751,628 metric tons were mined in the republic, and in 1913, 1,283,450 metric tons. The 1913 production, while less than that of 1912 (1,334,407 metric tons), was 95,397 metric tons greater than that of 1911. The price of locally mined coal in 1904 averaged $4.38 per metric ton and in 1913, $6.94 per metric ton.

The following is a list of the coal-mining companies in Chile in 1913, with the location of the mines and their gross production in metric tons of 2204.6 lb.:

Companies	Location of Mines	Production in Tons
Anibal 20 Zañartu	Tome	2,000
Cia. Carbonifera de Lirquén	Penco	30,000
Cia. Minera de El Rosal	Penco	18,000
Cia. de Lota y Coronel	Lota	291,308
Cia. de Lota y Coronel	Coronel	41,692
Cia. de Lota y Coronel	Coronel	12,763
Cia. de Lota y Coronel	Coronel	14,017
Cia. Carbonifera y de Fundición Schwager	Coronel	370,000
Suc. Rojas Miranda	Lota	10,000
Cia. Carbonifera (Los Rios de Curanilahue)	Carampangue	11,977
Cia. Carbonifera (Los Rios de Curanilahue)	Lebu	183,673
Cia. Carbonifera Victoria de Lebu	Lebu	16,000
La Cia. de Arauco (Ltd.)	Carampangue	37,032
La Cia. de Arauco (Ltd.)	Lebu	110,270
Cia. Carbonifera (Los Rios de Curanilahue)	Lebu	19,828
Cia. Carbonifera Millahuillin	Valdivia	600
Agustin Ross	Punta Arenas	14,200
Total		1,283,450

These mines employed 8414 persons, of whom 5929 were underground workmen. The average daily wages paid for underground work were approximately $1 United States currency per day.

The imports into Chile of steam, gas and other coals during the past five years were as follows: 1910, 1,293,000 tons; 1911, 1,367,874 tons; 1912, 1,524,652 tons; 1913, 1,540,747 tons; and 1914, 877,650 tons. The quantity given for the year 1913 is in accordance with the annual statistical returns of the Chilean customs authorities and came from the following countries: United

Kingdom, 924,430 tons; Australia, 457,873 tons; United States, 98,979 tons; Germany, 45,477 tons; Belgium, 13,413 tons; Netherlands, 575 tons; total, 1,540,747 tons.

The quantity given for 1914, 877,650 tons, may be taken as a fair approximation to the imports for that year, though the official statistics are not yet available. The total may be divided as follows: English coal, 453,999 tons; Australian coal, 407,601 tons; United States coal, 16,050 tons; total, 877,650 tons. During the second half of 1914 the imports were as follows: Australian coal, 251,304 tons; English coal, 192,493 tons; United States coal, 16,050 tons; total, 465,747 tons. The statistics for 1914 have been obtained from commercial reports compiled in the port of Valparaiso, which is the center for the coal import trade of Chile.

Decline in Use of Permissibles

The total production of explosives in the United States during the year 1914, exclusive of exports, according to figures compiled by Albert H. Fay, of the United States Bureau of Mines, was 450,251,489 lb., or 225,126 short tons, as compared with 500,015,845 lb., or 250,008 short tons for 1913. The production for 1914 is segregated as black powder, 206,099,700 lb.; "high" explosives other than permissible explosives, 218,453,971 lb.; and permissible explosives, 25,697,818 lb.

The figures represent a decrease as compared with 1913 of 23,839,831 lb. of black powder, 23,932,573 lb. of high explosives and 1,987,952 lb. of permissible explosives.

Mr. Fay says: "In the year 1902 only 11,300 lb. of permissible [or rather short-flame] explosives were used in coal mining, whereas in 1913 the quantity of permissibles so used was 21,804,285 lb., as compared with 19,593,892 lb. in 1914. The quantity of permissible explosives used in the United States is larger than in a number of foreign countries. In 1912 it represented about 5 per cent. of the total quantity of explosives produced and in 1914 5.7 per cent. The total amount of explosives used for the production of coal in 1914 was 220,622,487 lb., of which about 8.9 per cent. was of the permissible class, as compared with 9.5 per cent. in 1913."

Reasons Why Anthracite Mining Is Expensive

There are some important differences in the cost of mining anthracite and bituminous coal with which the general public is not familiar. The following table shows the total production of explosives in pounds in the United States, according to the United States Bureau of Mines, and the amount of the various kinds of explosives used in Pennsylvania to produce 91,626,964 tons of anthracite coal and 172,965,652 tons of bituminous coal in 1913:

	Black Powder	High Explosives	Permissibles
All mines in the United States	194,146,747	241,682,364	27,685,770
Pennsylvania anthracite region	44,001,660	16,093,035	3,323,645
Pennsylvania bituminous region	14,652,931	696,162	6,715,028

From this it can be seen that the anthracite region used almost as much "permissible" explosive in proportion to coal produced as the bituminous region. The presence of gas in sufficient quantity to be detected on an ordinary safety lamp makes the use of permissible explosives advisable, if not absolutely necessary, to prevent explosions being caused by the flame of the black powder so commonly used for blasting coal. The mining of anthracite consumed over three times as much black powder and 23 times as much "high" explosive as the mining of bituminous coal, despite the fact that only half as much coal was produced.

The figures given are probably reasonably correct, though the operators only know what powder they sell to their employees and keep no track of what is purchased from other sources. However, the amount so purchased is probably not large. Of course the larger consumption of powder partly arises from the fact that the anthracite miner "lets powder do the work." If the bituminous operator invariably shot his coal off the solid, he could pay his pick miners a lower rate per ton and would nevertheless pay them more per day if he could only sell the product. The greater consumption of powder in the anthracite region is therefore not without its advantages in the production of cheap, though less marketable, coal.

In addition to this heavy charge for explosives, anthracite has to be put through an elaborate process of manufacturing, and this is one of the reasons why 20 per cent. of the cost of preparing the coal for market is incurred after the coal has been removed from the ground. Great factories, called "breakers," erected for this purpose cost $200,000 to $400,000 and even $500,000. As compared with these mammoth structures the "tipples" of bituminous mines are relatively inexpensive.

Lake Vessels Transferred to the Ocean Trade

Following the decision of the Interstate Commerce Commission that package freight vessels owned by railroads on the Great Lakes must be disposed of, the roads have opened negotiations for the sale of their vessel property to ocean companies. The Erie Railroad Co. has already sold four and the Western Transit Co. is calling for bids for putting one of its ships in shape to go to the coast.

W. J. (Fingy) Conners, a millionaire of Buffalo and owner of a stevedore company operating in a number of lake ports, is at the head of a syndicate negotiating for the remaining package freight boats on the Lakes. Sixty-two package freight boats are affected by the commission's order.

The Erie has sold to William G. Davidson, president of the Staten Island Shipbuilding Co., the steamers "Owego," "George F. Brownell," "John G. McCullough," and "Granville A. Richardson." The "Owego" is 325 ft. long, 41 ft. beam, and 14 ft. deep, with a gross registered tonnage of 2611. The "Brownell" is a duplicate of the "Owego." The "Richardson" is 256 ft. long, 41 ft. beam, and 28 ft. deep, with a gross registered tonnage of 2237. The "McCullough" is 255 ft. long, 40 ft. beam and 21 ft. deep, with a gross registered tonnage of 1895. The "Owego" has been cut in two and is on her way to the coast. The "Richardson" and "McCullough" can go as they are. The "Brownell" is being remodeled at Buffalo, N. Y.

The ships that cannot be taken to the coast because of the limited size of the canals will remain under independent management. The ships that have been sold were built between 1888 and 1893. The newer boats, about 20 in all, are mostly too large for the canals.

Coal Handling at Panama

SYNOPSIS—This summer will see the completion of the two great coal-handling plants on the Panama Canal. The plant at Cristobal, on the Atlantic side, has a storage capacity of 400,000 tons, and that at Balboa, on the Pacific side, a little over 200,000 tons, divided into piles. The Cristobal plant will be capable of handling 2000 tons per hour and the Balboa plant about one-half that. The total cost, substructure and superstructure, will be about three and a half million dollars. Some wet-storage capacity is provided.

For military and commercial reasons it becomes necessary to provide in the Canal Zone great coal-handling plants. At this time it is not possible to estimate closely the quantity of coal these plants will handle yearly, but based upon the expected canal traffic and the amount of coal transferred at the entrance of the Suez Canal, it is assumable that in time the Isthmus may be expected to handle upward of one million tons a year.

Two plants are provided, one at Cristobal, Fig. 1, on the Atlantic side of the Isthmus, and one at Balboa, Fig. 2, on the Pacific side. The former will have a solid storage capacity of 485,000 tons, while the capacity of the latter will be 215,000 tons. This is based on short tons of 2000 lb. each, or on 40 cu.ft. per ton. If, however, the coal is divided into piles, as it probably will be, it will reduce the capacity below these figures. For example, in case the coal at the Cristobal plant is divided into 37 piles, the collective capacity will be not far from 400,000 tons. Of this storage capacity, and at the request of the Navy Department, 100,000 tons of wet storage is provided for at Cristobal and 50,000 tons at Balboa. The wet-storage capacity is to provide for the permanent storage of large amounts of coal without it being subjected to the deterioration in quality that occurs in long exposure to the air, and it also will avoid the loss in damage through spontaneous combustion, although the machinery is so equipped that burning coal may be easily transferred to places where it can do little damage. Wet-storage may not be used except in case of war.

The plans and sectional elevations, Figs. 3 and 4, indicate clearly how the plants are laid out.

The substructure of the Cristobal plant is made up of three large wharves. One at the long side of the pier is designated as the unloader wharf, and at the other side is the reloader wharf. The connecting wharf between the two at the water end of the coaling plant is known as the end wharf. A depth of 41 ft. at mean sea level has been provided for a distance of 1965 ft. along the unloader and the reloader wharves, and also at the end wharf. The plant has about 2500 lin.ft. of berthing space, with 41 ft. depth at mean sea level, and as the tide does not fall more than one foot below sea level, deep-draft vessels can be accommodated at any stage of the tide. The decks of all wharves are 10 ft. 6 in. above the mean sea level.

Referring to Figs. 1 and 3, the coal pile is spanned by two movable steel structures, known as the stocking and reclaiming bridges, which are capable of traveling the length of the pile, or about 1000 ft. These bridges are of heavy steel construction and supported on 32 wheels at each end, the unloader wharf affording support for one of them and the reloader wharf for the other. These bridges are a little over 315 ft. long. The upper chord of each supports moving units known as bridge diggers, each of which consists chiefly of a bucket that can command any part of the storage pile. It will be seen from Figs. 1 and 3 that while the bridge moves longitudinally of the pile, the bridge diggers move longitudinally of the bridge.

On the unloader wharf there are provided four great unloader towers, a good view of which is shown in Fig. 3. These have a travel of slightly more than 10[illegible] ft.

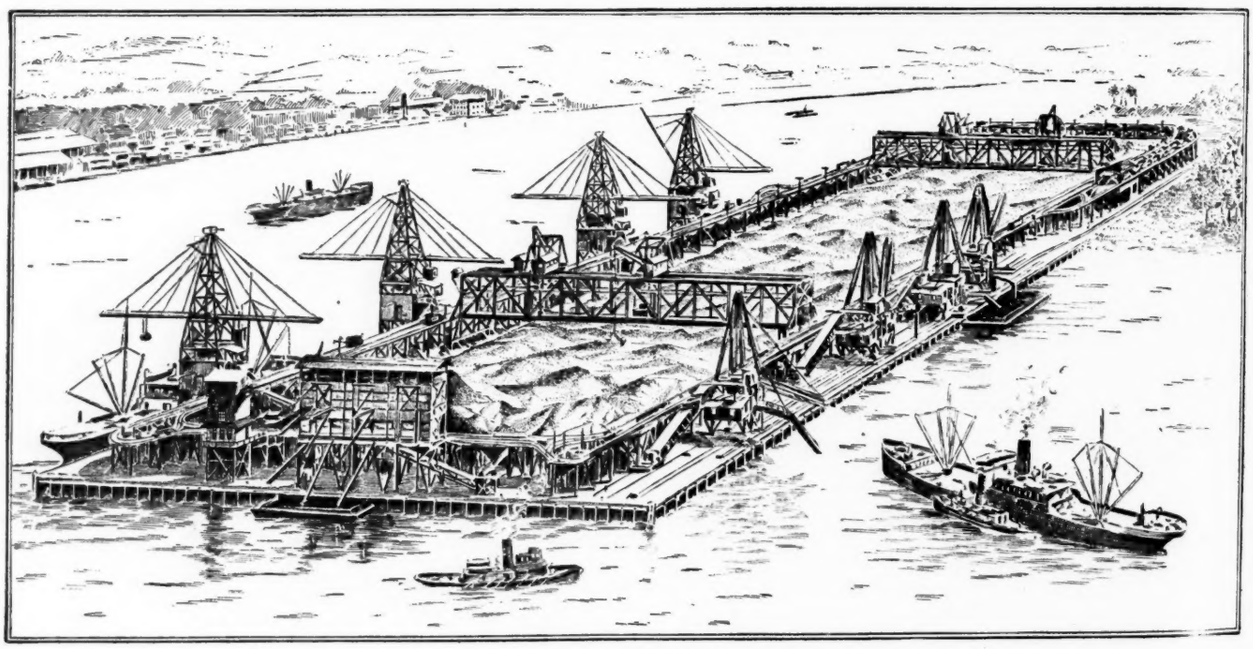


FIG. 1. COAL-STORAGE PLANT AT CRISTOBAL, CAPACITY 485,000 TONS

and command the length of deep-water berth on the unloader side of the plant. Their function is, of course, to unload coal from colliers and barges. The reloader wharf affords support for four moving units known as reloaders, and the maximum range of travel of these is such that they command practically all of the deep-water berth on the reloading side of the plant. The end wharf affords support for a wharf bunker of 15,000 tons' capacity, which is provided for the supply of coal to tugs and other comparatively small craft, thus making it unnecessary to start the plant to furnish small amounts of coal. The unloaders are operated by steam, while the remainder of the plant is operated by electricity. All parts are electric lighted throughout.

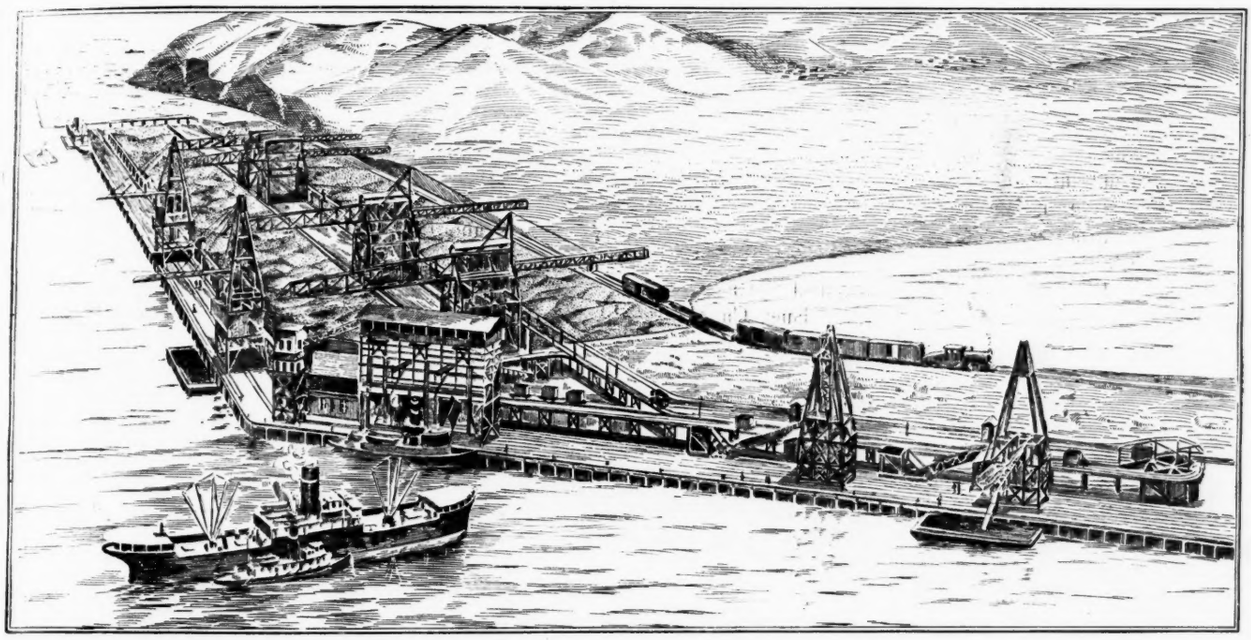


FIG. 2. COAL PLANT AT BALBOA, CAPACITY 215,000 TONS

The Panama Canal supplies electric current for the coal plant at 2300 volts to a substation on the west bank of the plant. The current is kept down to 440 volts for power and 110 for lighting, some of the necessary transformers being located in the moving units themselves and the remainder in the substation mentioned. The 2300-volt current will be supplied from the main Cristobal substation and will be brought to the coaling-plant substation, submarine cables being used to effect a crossing of the French canal which separates the coaling plant from the mainland.

An interesting point to note is that the tracks on stocking and reclaiming bridges are of the standard 5-ft. gage of the Panama Railroad, and they will be connected at the south end to the lines of this railroad. Thus there will be four parallel lines of standard-gage tracks extending the full length of the plant and connecting two of the main lines of the Panama Railroad. This will, of course, effect the convenient transportation of coal to and from the storage plant by rail.

Briefly, the substructure consists of steel and concrete decks supported by concrete cylinders 6 ft. in diameter, founded on solid rock. The spacing of the cylinders is largely dependent on the spacing of the rails for the support of the moving units, and the design of the deck framing has also been largely influenced by the position of the superimposed load. The deck-structure framing consists of steel plate-girders and beams. In all there was required about 5000 tons of structural steel and 18,000 cu.yd. of reinforced concrete. To support these decks, which have an area of about 200,000 sq.ft., 306 concrete cylinders, 6 ft. in diameter and ranging between 50 and 75 ft. in length, were required. These foundations were necessary inasmuch as the loads to be carried will, in many cases, be very heavy; for example, a load imposed on the substructure by one end of the stocking and reclaiming bridge can reach a maximum of nearly 1000 tons. The substructure of the Balboa plant is similar to that at Cristobal.

For loading and stocking, coal is taken from colliers or barges by one or more of the unloaders, which are equipped with 2½-ton buckets and have a normal rated capacity of 250 tons per hour each, or the four unloaders at Cristobal have a combined unloading capacity of 1000 tons per hour. The coal is delivered to cars running on the elevated railroads. Each car has a capacity of 10 tons and runs at a speed of 200 ft. per min. The cars are stopped and started by a trackman on the viaduct, no attention being necessary when they are in motion.

As shown in the drawings, the cars open at the bottom and are dumped by the trackman. Throwing of switches is avoided, as the cars are started and travel to the desired point over a predetermined route. For stocking, the cars must dump at some point over the coal pile, and this is done from a track at about the level of the lower chords of the stocking and reclaiming bridges, which track is connected with one of the elevated tracks on the viaduct, paralleling the bridge track by means of a sliding switch that moves with the bridge and guides the cars onto the bridge.

The coal is reclaimed from storage by one or more of the four bridge diggers that run on the top chords of the restocking and reclaiming bridges. Each of these bridge diggers is equipped with a 5-ton bucket and has a normal

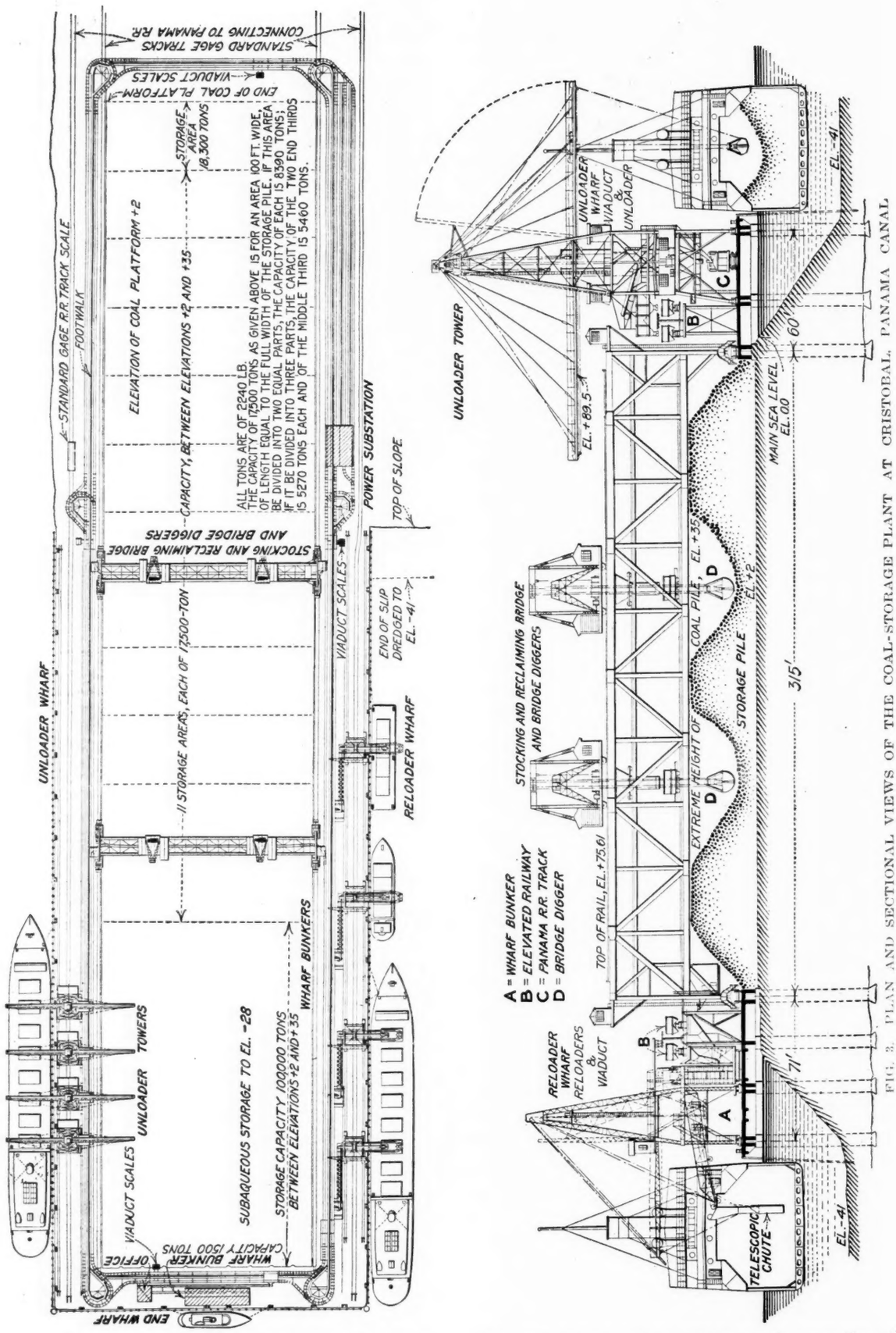


FIG. 3. PLAN AND SECTIONAL VIEWS OF THE COAL-STORAGE PLANT AT CRISTOBAL, PANAMA CANAL

capacity of 500 tons per hour, giving a total hourly capacity of 2000 tons. The reclaimed coal is delivered by suitable hoppers and valves in cars that transport the coal to the desired points, which may be near the unloaders, wharf bunkers, or to parts of the storage pile by means of the stocking and reclaiming bridge.

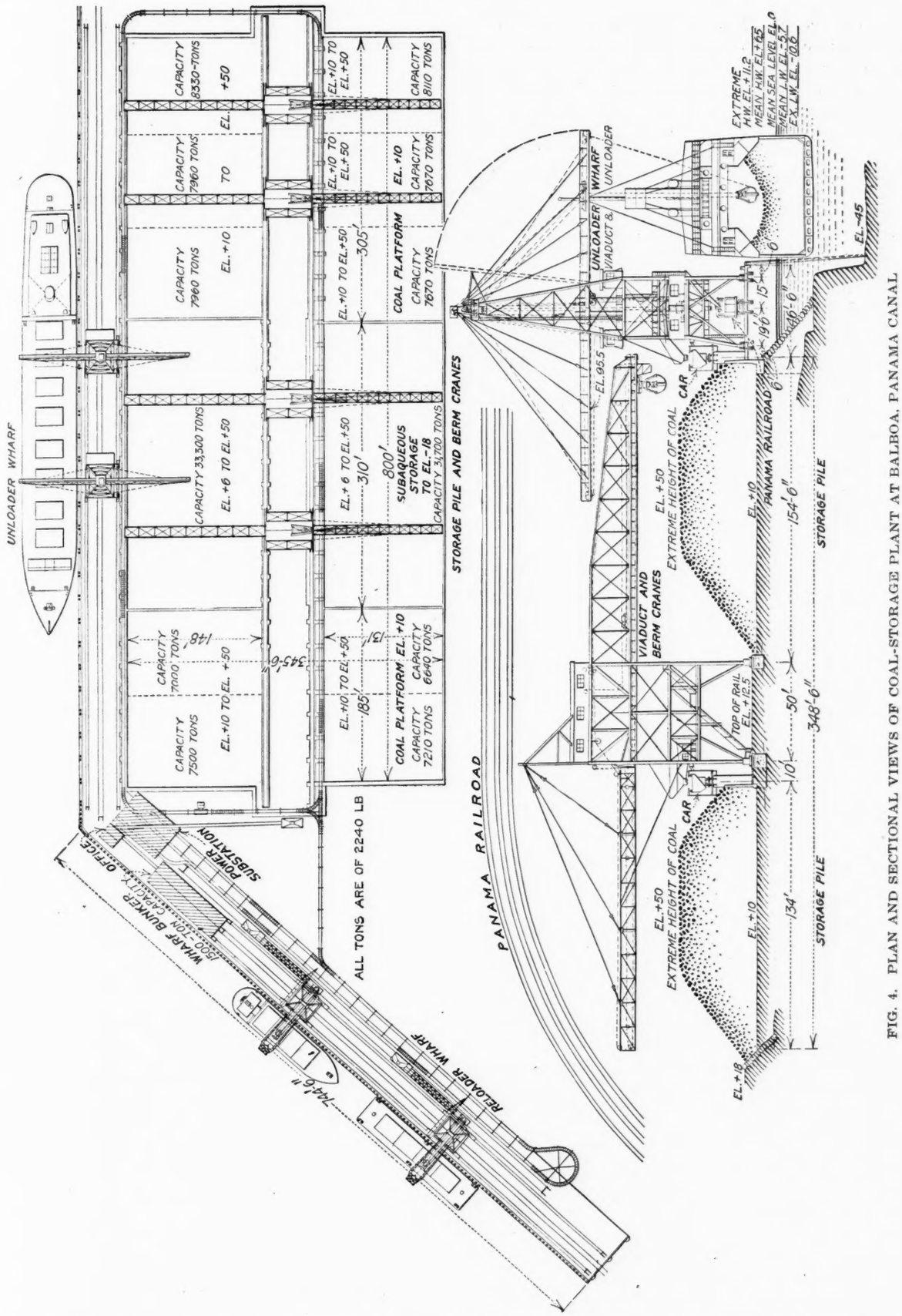


FIG. 4. PLAN AND SECTIONAL VIEWS OF COAL-STORAGE PLANT AT BALBOA, PANAMA CANAL

The wharf bunker receives its coal by means of a series of belts fed from a hopper into which the coal is dumped from cars. The reloaders are also supplied with coal by belts. Each reloader is provided with an appendage known as a trailer, consisting essentially of a hopper supported on wheels, which receives coal from the cars and

delivers it to an inclined belt supported by a truss that connects the wheeled hopper to the reloader proper. The trailer therefore travels with the reloader. From this inclined belt the coal is delivered to a second belt, carried by the reloader proper, and supported by a hinged truss capable of considerable range of motion in a vertical plane and fitted at its swinging end with a hinged telescopic chute. The hinged truss and chute are raised and lowered by a steel-wire rope passing over sheaves secured to the tower structure and actuated by drums.

It will be seen that these reloaders have a considerable range of point of discharge and that they take the place of the heavy and expensive wharf bunkers usually provided in large coal-handling plants. They are comparatively inexpensive and afford a range in capacity of discharge equal to that of a high wharf bunker.

The coal is weighed by semiautomatic scales provided at points along the elevated railroad, and the operating routes are such that a car must pass over a scale before reaching its point of discharge. A set of standard railroad scales is also provided for the railroad track at the wharf level, so that the weight of coal delivered to standard-gage railroad cars by the unloaders may be duly ascertained and recorded.

Signals and Capacities

A complete system of communication and signals, both visible and audible, is provided. Electric illumination is profusely provided, so that work may be carried on at night. It is not expected that the unloaders will be able to be worked at the same capacity at night as in the day, but every signal device, illumination, communication, control, etc., has been provided to reduce the loss of time to a minimum.

To provide for the safety of those operating the machinery, it was specified that no operation calling for high speed should require the simultaneous thought or action of more than one man. In the design of the machinery, consideration was given to the possibilities of protecting operators from the fumes and gases when removing burning coal. It was also stated in the specifications that each plant and the arrangement and character of its component parts should be such that failure of one part only should not bring the entire plant to a standstill. This referred especially to the conveyor system, wherein bypasses, intermediate storage hoppers, parallel lines, etc., should be provided to enable the handling of coal into and out of storage to proceed continuously and at as great a percentage of the normal rate as practicable, in the event of a breakdown of any part.

The operations of which the various elements of the plant shall be capable are of interest. Each unloading tower is capable of mining coal from the vessels and depositing it in the hopper built into the tower, whence it may be delivered through chutes to the conveying system or to standard 5-ft. gage railroad cars. The tower must also mine coal from the vessels and deposit it by buckets or shovels on the storage pile behind the towers; and it must mine coal from the storage pile behind the towers and deposit it in the hopper built into the tower; and it must mine coal from the storage pile and deposit it by buckets or shovels aboard vessels.

Each stocking and reclaiming bridge must be capable of restocking coal into any part of the storage pile by means of a part of a conveyor system supported by the bridge, and must reclaim coal from any part of the pile and deliver to the conveyor system. In addition to this it must be capable of stocking and reclaiming simultaneously, each at full normal rated capacity.

Functions of Conveying System

The conveying system has many duties. It is capable of receiving coal from a single unloading tower, or group of towers located anywhere on the wharf and transporting it to any part of the storage pile. It also receives coal from a single unloading tower or group of towers located anywhere on the wharf and transports it direct to the reloaders, which may be spaced at any interval along the unloading wharf, and delivers it to one only, or distributes it among any number of reloaders. The aim is to distribute the coal approximately equally among any number of reloaders in action. The conveying system can also receive coal from a single unloading tower or from two towers located anywhere on the wharf, and transport it direct to the wharf bunkers. It was stipulated in the specifications that the capacity of the conveying system leading to the wharf bunker must be sufficient to handle the maximum discharge from two unloading towers. The system is capable of receiving coal from a single unloading tower or group of towers located anywhere on the wharf, as when unloading but one vessel and transporting it to any part of the pile, while at the same time coal is being reclaimed from any part of the pile and being conveyed to reloaders or to the wharf bunker. It also is capable of receiving coal simultaneously from two vessels located anywhere along the unloading wharf and transporting it from both vessels to the same part of the pile, to the reloaders direct, or to the wharf bunker direct. If coal from both vessels is being transported to the storage pile, it is possible simultaneously to reclaim coal from any other part of the pile, by means of running the bridge or bridges, and transport the coal to the reloaders direct, or to the wharf bunker direct. The system is also capable of taking coal from any part of the storage pile and depositing it at any other point of the pile by the use of the bridges.

The plant at Balboa has only about half the capacity both in storage and in handling as has the plant at Cristobal. From the foregoing description and from the illustrations the differences in the two plants are readily seen.

All of the machinery, with the exception of the six unloader towers—four for Cristobal and two for Balboa—were furnished by the Bergen Point Iron Works, the contract price being $1,347,392. The unloader towers were furnished by the Hunt Construction Co., the contract price being $485,736, making a grand total of $1,833,128 for the machinery. These figures, with a statement in the specification to the effect that "the fact that the cost of substructure which will be furnished by the Commission will be the greater part of the cost for the entire plant should be kept in mind in the design of the coal-handling installations," would indicate that the total cost of both plants exceeds $3,500,000.

Inspection of Illuminants in Alabama Mines—The law enacted by the legislature of Alabama in 1911, regulating the inspection and use of illuminants in mines and sales of illuminants for the use of miners, and devolving the duty of inspection upon the chief mine inspector, is constitutional. (Alabama Supreme Court, ex-parte Burgin, 68 Southern Reporter, 49.)

Meeting of the Rocky Mountain Coal-Mining Institute

Mention was made in an earlier issue of *Coal Age* of the summer meeting of the Rocky Mountain Coal-Mining Institute, which was held at Trinidad, Colo., June 8-10. A full account of the meeting was held over, pending the receipt of complete and corrected copies of the papers that were read.

The meeting was called to order by President Weitzel. The members were welcomed to Trinidad by Mayor Taylor and A. L. Bramson, the latter a representative of the local board of trade. The transaction of routine business occupied the morning session. In the afternoon R. C. Hills, of the Victor-American Fuel Co., read an interesting paper entitled "Coal and Coal Fields of the Rocky Mountain Region."

The second day of the convention was devoted to a trip to Cokedale, Segundo, Primero and Tercio in a special train over the Colorado & Wyoming R.R. On this trip were 290 members and friends. The party arrived back in Trinidad at 6 o'clock in the evening.

The third day was devoted partly to business and to the reading of a paper on "Advantages of Social Welfare" by David Griffiths. Following Mr. Griffiths' paper was another on "The Use of Electric Safety Lamps" by A. E. Thompson. The afternoon of June 10 was devoted to a visit to the Victor-American Fuel Co.'s mines at Hastings and Delagua. The party returned at 6 p.m. and attended a banquet at the Cardenas Hotel at 9 o'clock, 158 members being present.

The membership of the Rocky Mountain Coal-Mining Institute now totals 485, which is quite remarkable for the short time the institute has been in existence.

The paper on "Advantages of Social Welfare" by David Griffiths follows:

The word "welfare" has a broad, comprehensive meaning. The Universal dictionary defines the word as follows: "The state of faring well; a state of exemption from misfortune, trouble, calamity, or evil; the enjoyment of health and prosperity; wellbeing, success, prosperity." So the word "welfare" covers all that can be done for the protection, comfort and happiness of our coal miners and their families.

In no other line of endeavor during the past decade have corporate interests and employers of labor shown so much zeal and interest as they have in the welfare of their employees. It is a world-wide movement. Its object is to create harmonious relations between employees and employer for the purpose of obtaining greater efficiency and averting industrial conflicts. Much has been done toward this end for the coal miners of Colorado, and much more can be done that will stand to produce the desired results.

As an example of what can be accomplished along these lines, I will quote in brief an article that I read some months ago in one of our magazines:

A few years ago an English syndicate purchased a large vineyard and orange grove in southern California. After the preliminary work of organizing, the directors of the organization selected an old English horticulturist of wide and varied experience in the plantations of the West Indies to take charge of the property. He in turn engaged several subordinate officers from the agricultural colleges who were theorists and not practical men. The manager and the overseers were paid a handsome salary and they lived on the fat of the land. To do the manual labor on the farm they hired about 200 coolie laborers to whom they paid 50c. per day and their maintenance. The laborers lived in hovels, shacks and dug-outs that were vermin-laden and unsanitary.

Their food was of the poorest and quite scanty. Year after year with theoretical management and coolie labor the enterprise was a financial failure. Finally the board of directors came to the conclusion that some kind of a change had to be made or dispose of the property. Rather than dispose of the property at a great loss, the board decided on placing a young, progressive American in charge of the property, who had but very little experience with grapevines or orange trees, but had made a study of the welfare of employees. He in turn selected two experienced grape and orange growers as overseers. Their first move was to provide the laborers with clean, wholesome and palatable food and plenty of it. Then they went to work and built commodious living quarters for about 80 men. After this was done they advanced the wages from 50c. to 75c. per day and started a system of elimination whereby the indolent, unclean and inefficient had to leave the service.

While these improvements and somewhat drastic changes were going on, the board of directors were very uneasy. However, the manager insisted that the money expended and the changes made would in the end bring about the desired results. The first year under the new management a great sum of money was expended on betterments and equipment. The second year a small profit was made on the whole investment. The third year 75 men well-fed and otherwise comfortably provided for did all the manual labor on the farm with the exception of harvest time, and instead of having an overseer over 15 or 20 men the two overseers did all the directing. The manager and overseers dined at the same table as the laborers, and their living and sleeping quarters were alike. Peace, law and order reigned supreme. Harmony and mutual interest was their slogan. Now under the complete revolution of affairs the syndicate is receiving a handsome interest on the money invested, and they would not dispose of the property for double the money they originally paid for it. Moral: Treat your employees right and just and your success is assured; or, any reasonable amount of money spent on the welfare of employees is a good investment.

Granting that the foregoing illustration is an extreme case, if such good can be accomplished in other industries it goes without saying that much good can be done on the same lines in our coal mining communities. Some of you will be apt to say that the comparison is not well-taken and that there is as much difference between running a farm and a coal mine as there is between running a wheelbarrow and a linotype machine. However, I believe that you will all agree that the principles involved are similar in both cases.

Purpose of Welfare Work

This welfare movement goes under various names and is carried on in various forms, but it has one common purpose; that is to obtain the coöperation and good-will of the employees. If we hope for the movement to attain the fulfillment of its purpose the employee must receive just and honest treatment, he must be considered an essential factor for its success, and he must have some recourse for his real or imaginary grievances.

The success of the movement for the welfare of the coal miner does not depend so much on the owner, president or general manager as it depends upon the treatment of the employee by the local management. It is surprising what ill-feeling, bitterness and hatred can be created by an irate superintendent or mine foreman when dealing with his subordinates.

It cannot be expected that the employee will be loyal if he is abused and brow-beaten by his superior in office. We do not want to forget that the men in subordinate positions are human and should be treated as such and that an Italian, Greek, Jap or Negro, or any other man irrespective of nationality, color or creed, if worthy of being in the service in any capacity, is entitled to a civil answer and courteous treatment.

Under no circumstances or conditions has a superintendent or mine foreman the right to abuse or ill-treat an employee. The boss at all times has the right to advise, to censure and even to dismiss from the service men who have violated any law, rule or regulation whereby their own lives or those of their fellow-workmen are jeopardized. To the unemployed, as well as to the employed, the superintendent should be courteous and civil; especially should he be so to a man when he is seeking work. The sober, honest, industrious workingman is not seeking work from choice, but from necessity, and as such he deserves sympathy and a patient hearing. We ought to remember and practice the wise proverb, "A soft answer turneth away wrath, but grievous words stir up anger."

Clerks and weighbosses should be civil and courteous to all employees, as an offensive word from them is oft-times far reaching in its evil effects. Our camp-store manager, as a rule, is a much-maligned man and he has an uphill job to counteract the prejudice against the company stores. However, he should at all times be civil and courteous to his patrons, not only for the sake of their patronage, but because of the evil influence any other course will have upon all employees.

Camp physicians should not only be attentive, but sympathetic, as a kind word in time of affliction goes a long way toward bringing about happy relations between employee and employer. I think that just, honest, kind and sympathetic treatment of the employees is the principal factor of success in any of our mining communities. Never has there been a truer saying than that made by the immortal Bobby Burns, "Man's inhumanity to man makes countless thousands mourn."

Need of Decent Surroundings

The safety and sanitary conditions of our mines are not perfect, but considering the adverse geological conditions and the comparatively short period of experience in coal mining they will compare favorably with older countries. If we expect to gain the good-will and confidence of the employee we must provide for him healthy and sanitary conditions to work in and be ever careful and vigilant as to the protection of his life and limb.

I believe that the dwellings in our coal camps will bear favorable comparison with any of the coal-mining communities in any of the other states in the Union where the mines have been operated for the same length of time. In the early history of coal mining in Colorado, and I presume in all other states, the pioneers of the industry had to live in tents, adobes, dugouts or log cabins.

Colorado's climatic and topographical conditions are not very favorable, her populace are varied and transient, and water, the life-giving element, is scarce and difficult to obtain at any cost. In some of our coal camps, however, where conditions are favorable and where the life of the mine will justify the expenditure, I think it would be a good move to give our wives and daughters modern conveniences in the home. If pantries, clothes closets, screened doors and windows, water in the house, sewer connections, etc., are essential in other communities they are also essential in our coal-mining camps. I do not know of any people who are more deserving of such modern conveniences than the wives and daughters of our miners.

The bath-houses that have been built in our various coal camps have removed a great drudgery from our homes and are much appreciated by those who are favored with this modern convenience. Recently much attention has been given and much work has been done in fencing and arranging for lawns and gardens around the dwellings. The beautification of our environment will tend to draw into our communities a better class of workmen and will encourage thrift and individual responsibility. There is no doubt that the man who spends his time at the altar of Demon Rum or in absolute idleness when not at his regular work is not as good a citizen and not as desirable a workman as he who spends his spare time in his garden among his flowers or in otherwise improving his surroundings.

The Advance of Prohibition

The use of alcoholic liquors and the toleration of saloons in our mining camps is a menace to their prosperity. I am glad to say that the days of the saloon in Colorado are numbered and that prohibition is gaining ground the world over. The Russian has given up his vodka, the Frenchman his absinthe, the Englishman has made the price of liquor prohibitive and the American Navy has abandoned the use of whisky; to cap the climax, Colorado has gone dry and placed in her statutes one of the strongest prohibition laws in existence.

With the removal of the saloon from our mining camps will come the necessity of providing suitable places for the relaxation of the mind and body of our coal miners. With this end in view, clubhouses, moving picture shows and playgrounds have been advocated. Some of the clubhouses are now in operation and others are in course of construction. Moving-picture shows are shown weekly in the southern field, and playgrounds for young and old are being made in many of our camps.

Probably a word of explanation on the clubhouse movement would not be amiss. The clubhouse is erected by the company and turned over to the employees free of rent. Light and fuel are furnished free. For the purpose of encouraging thrift and collective responsibility the management and control of the club are left entirely in the hands of the employees. The movement as yet is in the experimental stage, but it is the general opinion among employees that it will prove to be a success.

Moving-picture shows, if conducted on sound lines, can be made very instructive. It is the silent pedagogue of the age. The anti-fly, pure milk, anti-drunkenness and social justice films are the most powerful teachers in the country. The drama films encourage kindness, virtue and courage. The life of a miner at best is serious and solemn, so a good sprinkling of humorous films, like "Tillie's Punctured Romance," would be very agreeable in our coal camps, for a good hearty laugh is often much better for the human system than the doctor's pills. The moving-picture shows in our isolated mining camps are well patronized and are a source of good clean amusement.

Educating the Children

I have every reason to believe that the education of our children in the coal-mining camps is as efficient and thorough as it is in any other community, but I am inclined to believe that we have too many abstract themes and theories and that we are losing sight of the prac-

tical and applicable side of life. Education is an achievement, and to obtain it you must strive for it, and what is the use of our sons and daughters striving for education if it cannot be made helpful to their future existence.

What is the good of a workingman's son or daughter mastering geology, trigonometry or astronomy if he or she cannot make a living from it? Would it not be much better for our daughters to be taught how to make a palatable and wholesome layer cake than to be able to enumerate the sedimentary rocks in the Cretaceous period? Would it not be better for them to know of the hardy cereals and vegetables that will grow prolific in our arid lands than to be able to classify the flora of the Carboniferous era? Would it not be better for them to know how to mix and bake a baking of bread than to be able to take a theodolite out on the plains and calculate the altitude of Pike's Peak by trigonometry? It would be far more serviceable for them in future life to be able to trace a pattern over a piece of dress goods and know how to run a Singer sewing machine and make the lock and hem stitch so as to be able to make their own skirts and dresses than to be able to trace the elliptical orbit of Halley's comet in space.

I do not wish to be understood that our sons and daughters should be debarred from getting such special knowledge as I have mentioned; indeed, they should be encouraged to do so if they show any inclination or aptitude for such special knowledge, providing that their chances would be good in the future to make a living from what they had striven so hard to obtain. However, happy indeed is the possessor of the knowledge of the varied themes and theories that are taught in our schools, because a broad education makes us bigger and better and happier, and coal miners' children are as much entitled to these enjoyments as anyone else.

Young People's Organizations

The Sunday School, Boy Scouts and Camp Fire Girls in connection with this welfare movement are deserving of more than a passing remark. They are the coming Americans. To them we must look for the permanency of the movement. Into them are imbued the physical, mental and moral qualities of mankind, and in years to come the result of their training will bear fruit.

The past legislature has aided the welfare movement by giving us the industrial commission and the compensation laws. It is too early to criticize or pass judgment as to the efficiency and equity of the said statutes. However, similar laws are in effect in other sections of the country and have proven to be effective in preventing industrial troubles and rendering aid to the needy in time of affliction.

A Solution for Many Troubles

Treat your employees honestly and justly; protect and safeguard them while at work; give them comfortable homes to live in; remove alcoholic liquors from our camps and give their children education on practical lines, and our miners, or the majority of them, will be contented and our homes will be havens of happiness. To the extent in which we succeed in this will we make our coal-mining communities immune from the ravages of industrial conflicts and their evil consequences. It is my firm belief that in the camps where this welfare work will attain the highest degree of perfection will be found the most desirable workmen and the best citizens, and the financial success or failure of operations will be measured accordingly.

It is not to be expected that we will ever attain to Tom Moore's utopian standard of conditions in or around our coal mines or that our coal miners and their families will ever be as happy as the flock herders of Arcadia, but much can be done to bring about such conditions so that all the powers of the Black Prince cannot sever the harmonious relations between the contented employee and the kind and honest employer.

In conclusion, I wish to say that nothing is too good for the honest, industrious coal miner and his family. I have confined these disconnected remarks on welfare of coal miners to the State of Colorado, and more particularly to the company that I have the honor to serve. I hope and trust that they will be accepted in the same spirit as I have written them and that they will aid in bringing about happier and closer relations between employee and employer.

[*The other papers, "Coal and Coal Fields of the Rocky Mountain Region," by Mr. Hills, and "The Use of Electric Lamps," by Mr. Thompson, will appear in "Coal Age" next week.—Editor.*]

Ballads of a Coal Miner--IV

The Wise Guy

Written Expressly for Coal Age

By Bertot Braley

* * *

"YOU can't tell me nuthin'," the pitboss, he says;
"You can't tell me nuthin' a-tall,
I don't need advice from no hunkies like you—
An' if I do need it, I'll call;
I guess I kin tend to my business o.k.
Without no attention to nuthin' you say.

"You can't tell me nuthin'," the pitboss, he says;
"I reckon I'm on to my job,
An' I'll thank you to keep your suggestions to home,
You miser'ble ignorant slob;
I haven't no time fer to hear your idees;
I guess I'm the boss an' I'll do what I please."

Yes, that was the way that the pitboss come back
When I made a suggestion, polite,
But the Super he heard what the pitboss had said
An' he wasn't contented—not quite.
"Hold on there," he says, when the pitboss got through,
"I guess I'll horn in with brief word or two."

"They can't tell you nuthin'," the Super repeats,
"Then Lord help you, brother," says he,
"For the guy who imagines he's knowin' it all
Aint quite the right pittboss fer me.
If YOU can't learn nuthin' from no other man,
I'll go get a feller for pitboss who can.

"We haven't no use fer the feller," he says,
"That thinks he has knowledge to burn,
Who scorns all suggestions that comes from his men
An' won't never listen an' learn.
They can't tell *you* nuthin'—them words makes me tired,
An' I'll tell you something right now—you are fired!"

A New Electric Safety Lamp

SYNOPSIS—A lamp based on the design which received first prize in a recent British competition has been entirely remodeled. It now not only appears as a cap lamp, but is much lighter than before. The manufacturers are willing to lease the lamps, agreeing in their contract to charge, clean and maintain them for every shift.

The United States Bureau of Mines has just awarded approval No. 11 to the Manlite electric safety mine light. This approval covers not only safety, but efficiency and practicability in general service. The lamp is manufactured by the firm which a few years ago introduced the Ceag electric safety hand lamp.

Improvement of Battery with Use

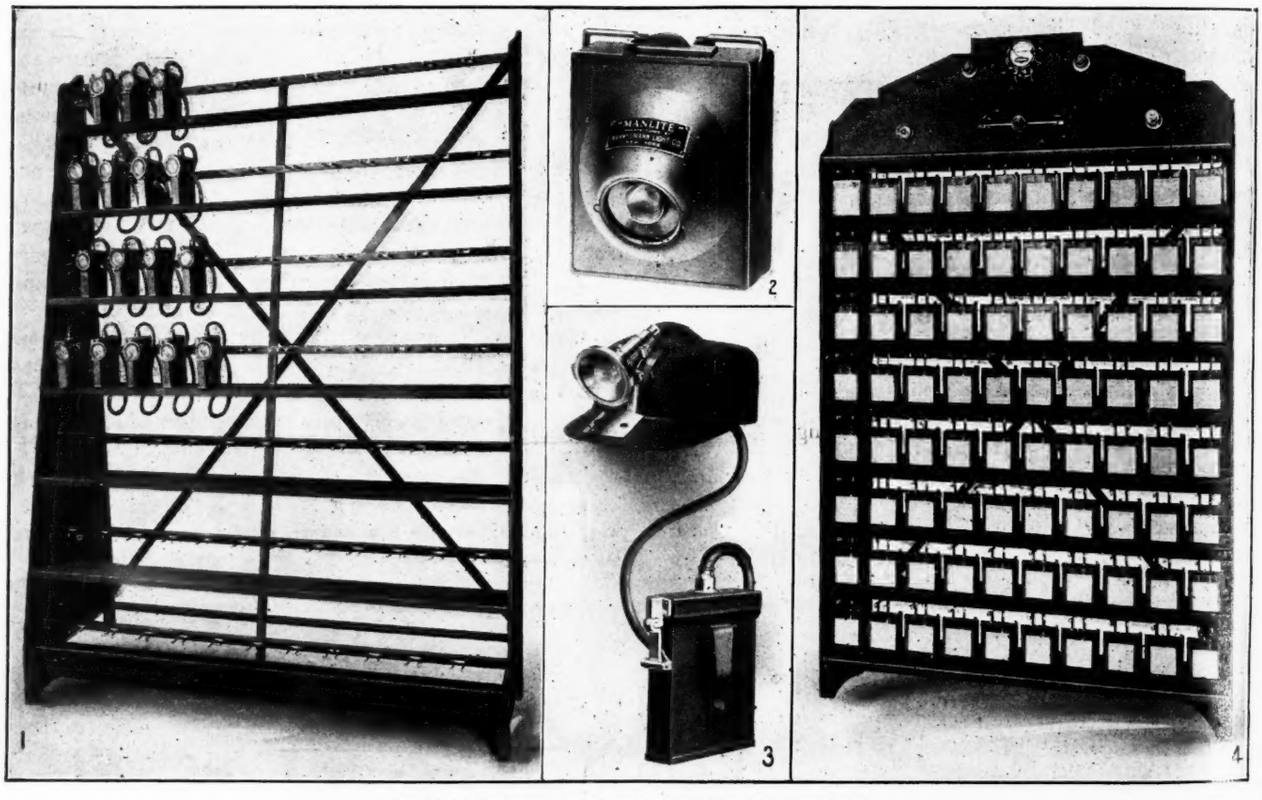
The lamp was approved only after passing exhaustive and severe tests in accordance with the exacting conditions which have been formulated by the engineers of the Bureau of Mines which are set forth in schedule 6A.

same point in a little over half as long again. The progress is thereafter not so rapid, but by the twelfth discharge the voltage is maintained at over 1.8 for more than 15½ hours. By the thirty-seventh discharge that period is extended over the sixteenth hour.

But these curves are based on a discharge of 1 amp., whereas the lamps only use 0.78 to 0.83 amp., and consequently the voltage is maintained for much longer periods than those mentioned. The curve of charge with 2 amp. on page 220 shows a slow increase in voltage till the fifth or sixth hour, when the rise becomes quite rapid till the seventh hour.

The batteries will supply light after 10 charges and discharges for 20 hr. at a stretch. This is not shown merely by laboratory observations and by deductions from curves, but by tests duly authenticated by mining companies which have used the outfits. This remarkable result is obtained despite the light weight of the battery.

The battery is of the lead-sulphuric acid type, the plates or electrodes being designed and constructed with a view to long life and dependable service. These plates



MANNESMANN MINE LIGHTING EQUIPMENT

Fig. 1. Lamp rack. Fig. 2—A lamp for use on a mule. It throws the light at the correct point on the track. Fig. 3—Lamp as worn on cap with battery for attachment to belt. Fig. 4—Charging rack

The lamp complete, including the battery, cable and head piece, weighs only 3½ lb.; of this the head piece weighs only 4 oz. The light is brilliant, but soft, and at the same time absolutely steady and unflickering for at least 12 hr. per single charge of battery. The curves of discharge of the latter on page 219 show how it improves in service.

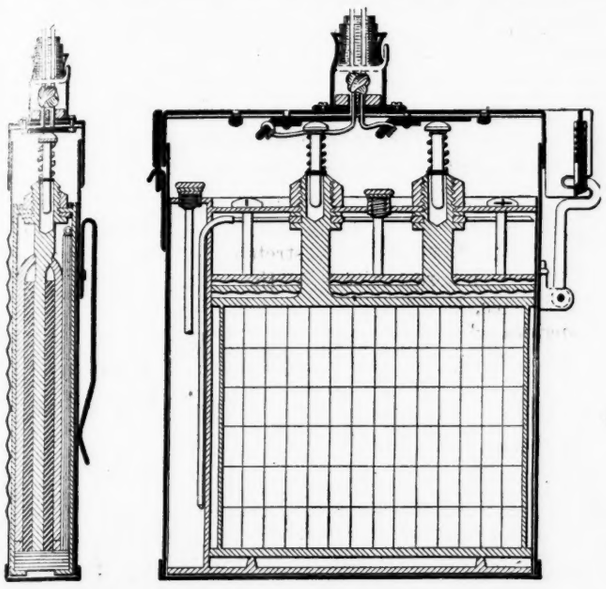
On the first discharge the voltage falls to 1.8 in a little more than 8 hr. The second discharge reaches the

are contained in a transparent case of remarkably tough and flexible material, which successfully withstood the dropping tests conducted by the Bureau of Mines under schedule 6A.

The use of a transparent container is a distinct advance in this type of accumulator construction, as it permits the attendant to observe at all times the condition of the electrodes, the quantity of precipitated sediment and the level of the electrolyte, all of which have an

important bearing on the service rendered and on the life of the plates of any storage battery. No other electric mine cap-lamp battery on the American market possesses this highly desirable and important feature.

The container is also absolutely non-spillable, being fitted with a unique siphon device which prevents the spilling of the electrolyte irrespective of the position



CROSS-SECTION OF BATTERY WITHIN NICKEL-STEEL CASE

in which the battery may be placed. The battery container proper is carried in a case constructed of nickel-steel. It is of rigid construction and exceptional strength and is fitted with a self-contained magnetic lock which can only be opened in the lamphouse. Thus the miners are prevented from tampering with it. The entire battery and case is so convenient and light in weight that miners have declared that after a few hours' use they are not aware that they are carrying a battery on their belts.

The conductor cable is of a special alloy of the highest conductivity and flexibility and is highly insulated. The cable is inclosed in a chrome-leather sleeve possessing great durability. The head piece, carrying the bulb, is unique in its simplicity and remarkable for its sturdy construction and extremely light weight. The shank of the head piece carries a safety device which absolutely prevents the ignition of explosive gases or mixtures even though the head piece be completely shattered.

The bulb employed, and approved by the Bureau of Mines, has a guaranteed life averaging 600 burning hours. It is held in the burning position by a perfectly ground crystal lens carried securely in place by the lens holder, the whole being sealed so that the miners cannot tamper with it.

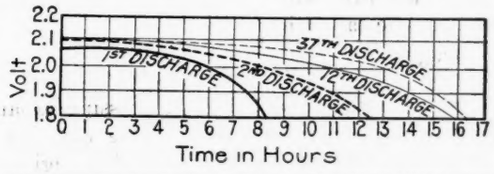
Miners Cannot Use Battery as Cigarette Lighter

There are no exposed terminals or parts of the entire equipment from which a spark or arc can be drawn, and the miner has access neither to the battery, conductor cable nor head piece and can extinguish the light only by breaking the lens. The outfit is therefore absolutely foolproof, as well as proof to dust and water.

The factors in this mine lamp which appeal to the practical mining man are safety, brilliancy and steadiness of light, simplicity of construction, economy in maintenance and adaptability to withstand rough usage. The equipment at the same time is no impediment to the miner when working.

The fact that the lamp has been approved is a guarantee that it is absolutely safe even in the presence of explosive gas. The further fact that some thousand of these lamps have already been in continuous use for several months by the foremost mining companies is a convincing assurance that the lamp is efficient and practical in general service underground.

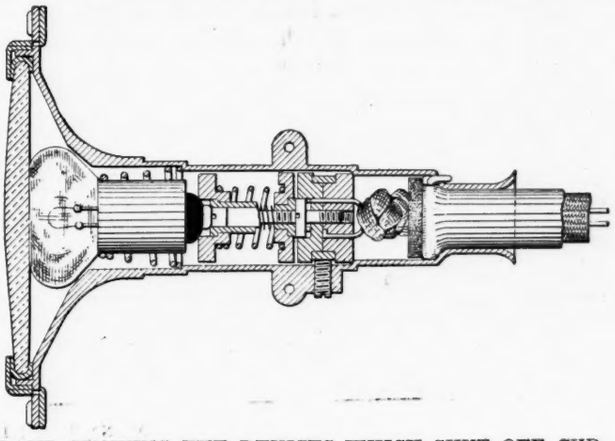
Accurate figures of the actual cost of upkeep of the lamp in continuous practical service for periods ranging from six months to over a year at various large mines



CURVES SHOWING HOW BATTERY MAINTAINS ITS VOLTAGE FOR A LENGTHENED PERIOD AFTER REPEATED USE

have been collected. They prove that the cost of material per lamp shift does not exceed 1½c. In a lamphouse operating 320 of these lamps during five months past no battery repairs or renewals were required aside from a small quantity of electrolyte. The cost of other mechanical repair parts for the 320 lamps amounted to only $15.25. *Coal Age* is not allowed to publish these figures, but has inspected them, and they will be furnished by the manufacturer to anyone desirous of installing such equipment.

The equipment is sold at a reasonable figure, and the cost of renewal and repair parts is equally low in price;



LAMP SHOWING THE DEVICES WHICH SHUT OFF CURRENT AND BREAK FILAMENT WHEN BULB IS BROKEN

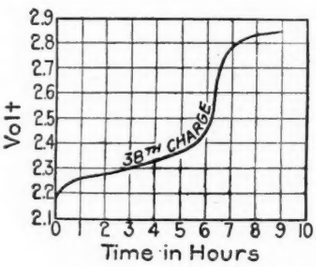
for instance, the cost of a positive plate approximates 50c., while a set of negative plates costs $1.

Use in a Steeply Pitching Coal Bed

Among the mines using these lamps and presenting the greatest working difficulties is the Vulcan mine, of New Castle, Colo. operated by the Rocky Mountain Fuel Co., one of the most progressive operating companies of the West, which has had an extended experience in the use

of electric mine lamps. The seam being worked at the Vulcan mine has an inclination of over 45 deg., but notwithstanding such adverse conditions, an equipment of these lamps in service for six months showed an average upkeep and repair cost of less than 20c. per lamp per month.

The service obtained with any electric miner's safety lamp depends entirely on the handling of the lamp and equipment. This has led the firm making the lamps to introduce a renting service. This saves the large expenditure of money involved where lamps are purchased outright. It also eliminates for the mining company the trouble of maintaining the lamps. When so rented the lamps and equipment remain the property of the manufacturer, who is bound by contract to deliver first-class lamp service, and also to furnish men to attend to the lamps. A suitable lamphouse, with hot and cold water and electric current, is furnished by the mine, and a small amount per lamp shift is paid as rental to the leasing company by the operating corporation. This system has given much satisfaction to the Keystone Coal and Coke Co., of Greensburg, Penn., among others. After a lamp cabin with a few hundred lamps had been operated by the manufacturer for this company for several months, at one of its mines, two additional mines of the same company were similarly equipped on a rental basis. The lamp is made by the Mannesmann Light Co., 329 Fourth Ave., New York City.



CHARGING CURVE OF MANLITE BATTERY

Electric safety lamps require the attention of trained electricians—reliable men who know all about the handling of accumulators. The Mannesmann Light Co. has a staff of such men who have been thoroughly trained in its own factory, and these men when running a lamp cabin will save money for the manufacturing company renting the lamps, thus enabling the rental to be put at what would otherwise be an unremunerative figure. There can be no doubt that the new method of renting will hasten the use of electric lamps in America and so advance safety in coal mines.

The Labor Situation

SYNOPSIS—John P. White declares that he does not desire a strike in the anthracite region and believes the men will secure adequate concessions without it.

The statement issued on July 27 by John P. White, president of the United Mine Workers of America, is so creditable to him and his organization that it is repeated in full:

"Articles appearing in certain newspapers during the past few days, for the most part published a great distance from the anthracite coal industry, which contain the information that the anthracite mine workers are making huge preparations for a big strike at the expiration of the present agreement Mar. 31, 1916, are absolutely unfounded.

"The campaign now being conducted in the anthracite region is for the sole purpose of uniting men of the mines as members of the United Mine Workers of America. When the anthracite miners have perfected their organization, I am of the belief that the union will be sufficiently strong and efficient to command the respect and recognition it deserves.

"I have every reason to feel assured that the operators, like the miners, want to be fair, and consequently I am at a loss to understand why the attempt in some quarters is being made to misrepresent the real purpose of our present membership campaign.

"Neither the International nor the district officials have formulated any plan that contemplates a strike at the expiration of the agreement. We are, on the other hand, hopeful that we will enjoy the opportunity to meet the operators in conference and reach a fair agreement embracing needed reforms and betterments that we feel quite confident the general condition of the industry will permit.

"The public should not become alarmed at the stories of a strike nature, for the mission of the United Mine Workers is one of peace, and I predict that such will be the outcome of our negotiations when we again meet the operators."

Central Labor Union Wants Help of Miners

On July 25 Steve McDonald, president of the Scranton Central Labor Council, made a strong plea before the convention of District No. 1 urging the miners to coöperate with other trades unionists in Scranton. So far the miners have never aided other labor interests by sympathy strikes nor have they been so aided, and the very nature of the contracts they seek to make would prohibit such action. To do as suggested would be to take a backward step.

But nevertheless McDonald would have them take it. "We should coöperate now," declared McDonald, "so that when the time comes to strike the enemies of humanity, it will not be necessary to appear before you to solidify your ranks." He urged that the strike of 1902 was won by the miners because the other labor elements had aided them and because financial assistance had been granted them throughout the country.

The speech of McDonald appeared to be a threat to make the strike in District No. 1 cover all the trades in that district and not merely a strike of miners, provided the latter and their employers could not come to an agreement. There seems to be a movement on foot to permit the Central Labor Council in the district to take up the disputes with the operators and decide them in place of the conciliation board.

The cry of labor solidarity always has a strong appeal, and it did not fail in this case, for the remarks of McDonald were loudly applauded. It is doubtful if the leaders of the miners are likely to be pleased, and it is extremely questionable if plasterers, masons, hodcarriers, carpenters and what not can help decide what miners should do, should concede and should demand. Clearly such an affiliation is another case of absenteeism; even the advocates of the miners are to be men who cannot tell a pick from a mattock. The miners have been storming at mine foremen who have never dug coal; now they are apparently willing to surrender leadership to men who never entered a shaft.

And yet like many other matters this would not be without advantage to the public, for the miners would then be restrained from too liberal demands by the interests of workmen who, engaged in other trades, look upon coal, not as a source of income, but as a large yearly drain on the family purse. However the workmen of the anthracite region realize that large wages paid by those outside the district are a source of prosperity to those within, and the solidarity might array all trades against the consumers both poor and rich in distant farms and cities.

Miners Seek To Keep Their Officials from Peculation

The union miners in District No. 1, having found that the peculations of their officers have caused defections to the Industrial Workers of the World, are determined to prevent them by bonding their local treasurers for twice the money handled at any one time and by securing the financial secretaries with a bond for $300. A resolution to that effect was passed by the convention. It is said that the Old Forge local union has lost $1200 by a defection of the treasurer, and many members are now followers of the I. W. W. in consequence.

The miners desire to get a compensation agent who can not only talk English, but Polish, Slavish, Italian, Russian and Hungarian, and who will issue the provisions of the act in those tongues. Linguists of such broad scope are in large demand everywhere and are not likely to be secured by the miners, but the demand for translations of the law are both feasible and to be applauded. In fact, the state might well undertake the work.

The Tridistrict convention in which will be represented all the union mine workers in the anthracite region, comprising districts 1, 7 and 9, will be held in Wilkes-Barre Sept. 7, according to a notice sent out by the district presidents and secretaries. This will prepare the demands to be made on the operators for a revision of the contract which will expire on Mar. 31, 1916.

Death of Frank A. Hill

This article was prepared for *Coal Age* by W. J. Richards, president of the Philadelphia & Reading Coal & Iron Co., and Baird Halberstadt, mining geologist, of Pottsville, both of whom were lifelong friends of Mr. Hill.—Editor.

Marked ability; wide experience in geology, mining and business; sound judgment, kindly frankness, absolute truthfulness; loyalty to his employers, his employees and his friends; devotion to his family; consideration of the feelings of others, and intense patriotism were the striking characteristics which made it possible for Frank A. Hill throughout his life to command the respect and esteem of all with whom he came in contact.

Mr. Hill, whose death occurred at twilight July 13,

FRANK A. HILL

1915, at Pottsville, Penn., was born at that place on Jan. 30, 1858. He was the son of the late Charles M. and Maria G. (Ayer) Hill. He came of a family that had long been connected with anthracite mining, his father having for many years been actively engaged as an operator and superintendent, operating the Oak Hill and other collieries in the southern anthracite field.

Frank A. Hill was educated in the private and public schools of Pottsville, graduating from the high school in 1875. Upon his graduation, he was appointed a chainman on the engineer corps of the Philadelphia & Reading Coal & Iron Co. under Gen. Henry Pleasants. With this company, he remained until the organization of the Second Geological Survey of the anthracite fields in 1881, when he was appointed as an assistant to Charles A. Ashburner, geologist in charge.

Mr. Hill's first geological work was in the Panther Creek district. Upon the organization of the other districts, he was assigned to the northern coal field in charge of the work, with headquarters in Wilkes-Barre, and later at Scranton. In 1885, he was transferred to the headquarters of the survey at Philadelphia, and the conduct of the work in the entire anthracite region was under his direction. In charge of this work, he remained until 1890, when he was made superintendent of the Dunbar Furnace Co., in Fayette County.

A short time after assuming charge of the furnaces and mines of the Dunbar Furnace Co., there occurred the disastrous fire at the Hill Farm mine, resulting in the death of 31 employees. Mr. Hill's heroic conduct in attempting to rescue these men alive called forth the highest praise, not only from the Government inspectors, but from the officials of the labor oganizations and the relatives of the entombed men.

Resigning his position at Dunbar in 1893, he was elected vice-president and general manager of the Southwest Virginia Improvement Co. With this company he remained until 1895, when he resigned to accept the office of general manager of the Hull Coal and Coke Co., with headquarters in Roanoke, Va. With this corporation he remained until 1908, resigning to become resident director of the mining interests of Madeira, Hill & Co., establishing his headquarters in Pottsville. It was this position he held at the time of his death.

In October, 1893, Mr. Hill was united in marriage with Alice Marie Müller, of Joliet, Ill. To this union were born three children—Frank, Marie and Alexandria, who with his widow and sister survive him.

The funeral services, held at his late residence upon Friday afternoon, July 16, were attended by prominent coal men from all parts of the Eastern United States. Interment was in a plot recently selected by himself in the Charles Baber Cemetery, at Pottsville.

In the death of Mr. Hill, the coal industry as well as his friends, whom he numbered by the thousands, has met with a severe loss.

The following editorial by H. I. Silliman, editor of the Pottsville *Journal,* shows the high esteem in which Mr. Hill was held by his fellow-townsmen.

"Frank A. Hill, whom God has seen fit to take from this community, was an unusual man—a man possessed of so much in high and splendid qualities that one felt honored by his friendship. He stood for so much in manhood; his manner was so gentle, but withal he was so virile that it is hard indeed to pen a proper appreciation of him.

"Frank A. Hill was a leader of men. He led them by the force of his dominating ability and his gentleness. He won the confidence of all men because there was something about him that seemed to speak out to you and say, 'Here is a man; mark him well.' He had no quarrels with the world; if he could not speak well of a man he did not speak ill of him. He was always arrayed, in all the strength of his fine manhood and courage, against that which was base and ignoble; he upheld with his voice, his talent and his means all things that tended to uplift and make better.

"Mr. Hill was a graduate of the Pottsville high school which has been dubbed 'the College of Mining Managers' because it is the only 'college' that the manager of nearly all the big anthracite coal companies ever knew. Of all the strong men this splendid institution has given to the world there is none that has reflected more credit upon it than Frank A. Hill."

Editorials

Colorado School of Mines To Honor Dr. Holmes

The editorial in *Coal Age* last week entitled "A Memorial for Dr. Holmes" has brought forth numerous suggestions indicating the high esteem in which Dr. Holmes was held by the mining fraternity. The following telegram is interesting and will meet with the warm approval of the friends of the late director of the United States Bureau of Mines:

Referring to your editorial of July 31 concerning a memorial for Dr. Holmes, desire to say that the Board of Trustees of the Colorado State School of Mines will take action Aug. 12 on the establishment of the Joseph A. Holmes Professorship of Safety Engineering in honor of the man who did so much for the welfare of mining and metallurgical interests in this country. We feel here in Colorado that we could not provide a more fitting memorial to his memory. WILLIAM B. PHILLIPS, President Colorado State School of Mines.

Coal Age wishes to congratulate the School of Mines on this fine show of appreciation for the faithful and efficient labors of a loyal and respected man, who stood for the highest ideals in the science of mining.

A 40,000,000-Ton Annual Cut in British Exports

By far the most significant development in the export trade since the inception of the European War is the cable report just at hand to the effect that Great Britain has placed a rigid embargo against all exports, including those to her allies and excepting only British possessions and protectorates. In view of the turmoil prevailing in the coal fields of England, which has attained to more serious proportions than is perhaps generally known, this new regulation was not entirely unexpected by well-informed observers who have been closely following the trend of conditions.

Computed on the basis of the June exports for the current year, the order will mean the withdrawal of 3,561,650 tons of British coal per month from the world's markets. This figure may be assumed as a conservative estimate since the new conditions developed by the war may now be considered as fairly representative. During June Great Britain exported 3,725,423 tons. If we interpret correctly the meaning of this new regulation, the possessions which may still receive coal exports from England took only 163,773 tons during June. These include Gibraltar, Malta, Egypt, including Anglo-Egyptian Sudan and Aden with her dependencies. In normal times Egypt alone absorbs more than 200,000 tons per month of British coal, whereas this is now down to only about 65,000 tons, so that it will be seen this estimate takes into full account the present war conditions. Assuming this to be a typical month, this means a shortage in the foreign markets aggregating more than 42,000,000 tons per annum.

In the midst of all the excitement and flurry accompanying the reports of a tremendous expansion in our coal-export trade, it is well to remember that we have, on the contrary, suffered a sharp decline in our export shipments. It is true that there has been an unprecedented movement in new directions, as for instance to Italy, which has taken 1,250,000 tons during the past 11 months, as compared with practically nothing previous to this time. On the other hand, this gain has been more than wiped out by a decline of more than 3,000,000 tons, which we have lost in the bituminous exports to Canada during the past year.

Our gross exports for the 11 months ending May of the current year are 12,500,000 tons, as compared with 14,500,000 for the same period last year, showing a direct loss of 2,000,000 tons covering what is essentially the war period.

Turning again to the new regulations regarding the British exports, it is interesting to note that the tonnage she is withdrawing from the world's coal markets amounts to approximately three times our normal exports. In view of the fact that we are the only large producing country which can be drawn upon to make up this enormous deficiency, these figures are certainly significant. Lack of adequate shipping facilities and also probably insufficient loading capacity at our piers make it inconceivable that we would at any time in the immediate future be able to triple our exports, but there can be little doubt that we are now on the eve of a new era in the export trade.

To the Unsuccessful

This is written to the unsuccessful not because others will not be interested but because the fellow down on his luck will best understand it. It is certain it will not please him as much as it will others, but, then, nothing should be written merely to please. An attempt, at least, should be made to inform.

Some years ago you married, bought some furniture and began to raise a family. You had ambitions and hoped that after a few years of hard work, care, thrift and saving you would have a nice little bank account. But it didn't go that way. An insurance policy was taken out, but times got so bad you borrowed money on it, and year after year you had to pay interest on the loan, which had a way of increasing with frequency.

The furniture was new when you were married, but time has passed and the neighbors would not now take it even as a gift. The outlook is gloomy in the extreme. You had promised yourself to make each year pay for itself, yet every year since then seems to have been a clear debit; yet your income has not decreased. If anything, it is larger than it was. Now to add to your troubles there are more mouths to feed and you are getting old and beginning to fail as the years increase.

If all the people in the United States made a similar showing to yours—passed from year to year with their depreciations unreplaced, with their borrowings increased, where would the country end? And yet there are people, who are fair and honest in their dealings, who would like every dollar to go in wages and not a cent in profits or repairs, so much do they object to capital. They

forget that the country is growing older and less fertile and less full of resources and is daily increasing its population. They forget its comforts must decline if for more people there is less substance.

Such people would bring Uncle Sam to the same unfortunate condition you are in. But if you could make a 50 per cent. saving and Uncle Sam could put 50 per cent. into profitable development, such as the Panama Canal, railroad lines, permanent roads and good houses for workingmen, and the other 50 per cent. into satisfying his immediate needs, how you and he could progress from comfort to comfort!

It is clear that profits are the hope of any nation, just as profits or savings are the sheet anchor of any individual. There is no doubt that there should be a big profit—that is, large savings. The only reasonable difference between economists is whether that profit should be private or public—that is, whether we should have private ownership or socialism. We cannot doubt but that the chisel of labor must be made effective with the hammer blows of capital; but just what form that hammer shall take is uncertain, even though we are sure that the chisel alone would be ineffective.

Asquith and Lloyd George have been urging the British people to save; but there is little hope that they will economize. For war times stir the mind and excited men spend like gamblers. There is no resource except in profits if Great Britain expects to lay aside $5,000,000,000 out of earnings. Perhaps it was because it remembered this that the government has been so loath to forbid large dividends. Only such a source of revenue as accumulated profits can prevent the country from becoming a debtor to nations that, being free of war, have money to lend. It is not likely that any appeal will make the British save, any more than such an admonition would make us thrifty in this country. Enforced temperance might accomplish something; but even that is doubtful.

It is a fact that a large percentage of British workmen now spend more than they receive as wages, for they are recipients of free education and of mothers' and old-age pensions partly provided by the state, which in Great Britain secures its funds mainly out of the profits of capital. It is also true, of course, that a large number have much money expended on them in dispensaries and relief organizations. If it were not for profits these pensions and assistances could not be provided. The men mentioned may not be larger consumers than producers of wealth, though many of them are, but it is only the profits of the manufacturer which prevent this being a fact. Even if these profits were divided among the producers, the small sum thus provided would be immediately spent. The world will never grow, and it never has grown, except by dint of large profits. The problem to be met, and met soon, is how they may be distributed. Anyone who knows how the future is hampered by the policy of doing business on the meagerest of returns will realize that it is the nation's business to see that the investment both in capital and in labor is laying by a profit and amortizing its losses.

But it must be remembered that the economic problem of national advancement opposes, face to face, the question of moral health. Great wealth in the hands of individuals has corrupted many peoples and demoralized those who had it as well as those who had it not. It has been hard for the millionaire to be a man, and the attainment of real manliness is almost, if not equally, as hard for his employee, for the rich man tends to corrupt his poorer neighbor.

These remarks do not attempt finality. The problems at present seem to elude settlement, so the thoughts here expressed may be somewhat slangily ended with the colloquialism, "What's the answer?"

The Value of Safety First

The Madison Coal Corporation has had much success in its safety propaganda and in insuring its miners against injury. It has always carried its own insurance fund.

But there should be some hesitation in taking the success in safety propaganda and auto-insurance of A. J. Moorshead, president and general manager of the Madison Coal Corporation, as an example, for those who know Mr. Moorshead's ability in dealing with men will realize that his success might well be due to the man and not the methods. Two men do the same thing, follow an identical course and an extremely different result is obtained, for one man is magnetic and the other cold and dictatorial. One man leads and the other man seems merely to organize opposition.

But whether Mr. Moorshead or his methods are to be credited, he has been quite fortunate in reducing his accidents and settling his labor claims. It must be admitted that so far he has had no major accident. Still it is worthy of notice that in 13 years he has had 60 damage suits and has won them all, which shows that he has been disposed to settle every reasonable claim.

He has carried his liability for 0.6446c. per dollar of payroll and in addition to paying all expenses has accumulated out of that charge a liability insurance fund of $38,000. Deducting this surplus, the cost of accidents to the company has been only 0.4664c. per dollar of roll. The higher figure, 0.6446c. per dollar, is less than one-third of the best mutual rate and less than one-sixth of what a good stock company would demand.

We fear to offer for commendation a small feature of Mr. Moorshead's campaign because there is always the risk that someone will think it is alleged to be the main source of his freedom from accident, which would of course be absurd. Nor is the idea advanced as new. It has been used before in a slightly different form by the Susquehanna Coal Co. and perhaps others, and as far as can be discovered not without success.

The Madison Coal Corporation puts into the pay envelopes slips of paper of a different color each time with mottoes or warnings printed thereon. Such mottoes are: "Be sure the roof is in safe condition before commencing work." "Use care and avoid injuries." "Be careful all the time—and you won't be sorry afterward." "Someone's carelessness is the cause of every accident; don't be the one." "Better be safe and sure than crippled and poor." "Do not take chances; look—think—listen—before you act." "Where caution ceases danger begins." "The chance-taker is the accident-maker." "Is it safe? Be sure." And then finally an admonition of another sort, "Use as little powder as you can; it will save you money and give the company a better grade of coal."

It must be said that fortune does not unduly favor the Madison Coal Corporation. It operates the No. 6 seam in which statistics show that more fatalities per ton occur than in any other machine-mined bed in Illinois.

Sociological Department

Victor-American Fuel Co.'s First-Aid Contest

By Tracy Garrett*

SYNOPSIS—The writer gives a careful criticism of the first-aid work of the various teams contesting for first place in the contest of the New Mexico division of the Victor-American Fuel Co. The Heaton team used cadgers of carbide to warm those who were suffering from shock.

First-aid teams representing the Heaton and the Weaver mines tied for first place in the annual first-aid contest of the New Mexico division of the Victor-American Fuel Co. held at the company's athletic park, Gibson, N. M., June 13. The handsome silver loving cup presented by the fuel company for these contests was finally awarded to the Heaton team. The Weaver first-aid corps, which has held the trophy since the last previous contest, gracefully relinquished its possession, but is determined to bring it back across the hills next year. The Navajo mine entered two teams, one from each opening. Navajo No. 2 finished third and Navajo No. 1 fourth.

This year's contest was pronounced by all the most successful that has been held. The interest in the rivalry was general, and the large amphitheater was well filled with spectators. The judging was done by Dr. A. H. Schermann, of the Diamond Coal Co., Allison, N. M., and James Yates and Tracy Garrett, division officials of the Victor-American Fuel Company.

At the conclusion of the contest the judges declared that the work of every team taking part was far above the average,

HEATON TEAM, WHICH RECEIVED TROPHY AT THE ANNUAL FIRST-AID CONTEST OF THE NEW MEXICO DIVISION OF THE VICTOR-AMERICAN FUEL CO.

From left to right standing, J. E. Ambrose, superintendent; A. Browning, J. Jackson, J. Peckand, R. Dennard; kneeling, A. Jackson and R. Sneddon

the poorest being sufficient for all practical purposes, and that most of the deductions made against any team were for minor omissions, in the case of the Heaton team being for failure to complete one event within the specified time limit. Dr. Schermann, who had never before seen any of these teams work, remarked particularly upon the efficiency shown and the practical character of all the work.

For the contest, two rows of mine props were set 8 ft. apart, at 10-ft. intervals for a length of 125 ft. Strips were nailed from top to top of opposing posts, 6 ft. above the

CONTESTING TEAMS WITH THEIR PATIENTS SPLINTED FOR THE SUPPORT OF A BROKEN BACK

ground, and ropes were stretched along the sides, connecting the tops of the posts. These bounds were placed to simulate an entry in a mine. In one place props to represent a fall were piled half way up to the cross-strips mentioned, and at another a low place, 4 ft. high, was arranged. The fuel company's ambulance was also on the grounds, and each team furnished its own first-aid material, the judges passing upon what could legitimately be used as such.

Carbide Cadgers for Heat in Case of Shock

The two teams representing Navajo and the Weaver team made use of safety lamps for applying heat in treating for shock, but the Heaton team used carbide cadgers, warming these by moistening the carbide which they contained.

Specifications for ten events were placed in envelopes, and the judges drew out five shortly before the contest started, so that no team or instructor would know in advance what events would be called.

The first event was the rescue of a man overcome by gas in a low place. He had become unconscious and must be dragged 10 ft. to a higher place and carried 50 ft. to good air. At that point artificial respiration was administered for one minute. The time allowed was 6 min. The Weaver and Navajo teams were each penalized in this event for failure to treat for shock before leaving the patient. Aside from this, the work in this event was particularly good.

Robert Dennard, captain of the Heaton team, besides using his safety lamp to test for inflammable gas before entering the place where the victim was lying, used a canary bird to test for carbon monoxide. It was the first time a bird had been introduced in a first-aid contest in this section, and while no extra credit was allowed for its use, it was an interesting feature and secured the applause of the spectators.

The second event was for full teams, and a simple fracture of the right thigh was treated. The victim was put on a stretcher, carried 50 ft., lifted over an obstacle and put into the ambulance. The time allowed was 10 min. The Heaton team took 11 min. and 20 sec. to complete the event and was accordingly penalized, but in every other way its work was of a high order. The Weaver team finished this event with a perfect score, coming well within the time limit, yet working deliberately, carefully and handling the patient in a most creditable manner. Navajo No. 1 was penalized for failure to sound the roof before taking the patient over the fall and because the captain did not handle the team properly.

The third event was the bandaging of a victim whose back was broken. The contestants improvised a stretcher and carried him 50 ft. All teams constructed their stretchers with the aid of jumpers, drills and bars. The time allowed was 10 min., and although the long back splints had to be assembled and padded, all teams came well within the time limit. The Navajo No. 1 team was penalized in this event for failure to do the most important thing first, a stretcher being made before the patient was treated and made as comfortable as possible. At the conclusion of the event and after the judges had carefully inspected the bandaging, they re-

*Assistant general superintendent, Victor-American Fuel Co., Gibson, N. M.

quired each team to raise its patient to make sure that the splints were so securely bound that the man could not slip.

The fourth event was the bandaging of simple fractures of the left humerus and right kneecap. The victim when treated was put on a stretcher. The time allowance was 8 min. All teams completed their work well within the limit and with excellent results. The chief deduction in this event was against Navajo No. 2 for putting the lower bandage too far from the injured kneecap.

The fifth event was the bandaging of a simple fracture of the right leg below the knee and a simple fracture of the lower jaw. After treatment the victim was put on a stretcher, the time allowance being 8 min. All the teams bandaged the head in a satisfactory manner, but Navajo No. 1 handled its stretcher with insufficient care.

Triangular Bandages Those Most Used

Under the rules either the triangular or roller bandage could be used, but the former was the more popular. In the last event, however, the Heaton team used a roller bandage in treating for simple fracture of the leg and did a particularly neat job although no additional credit could be allowed for it. The work of the Weaver team in applying triangular bandages to the patient's broken jaw occasioned favorable comment from the judges, as did the rapid and efficient work of Navajo No. 2. The work of Navajo No. 1 was rougher and not so well finished as that of the other teams, but in a practical test with underground conditions there is no doubt this team would show particularly well.

First-Aid Contest in Virginia

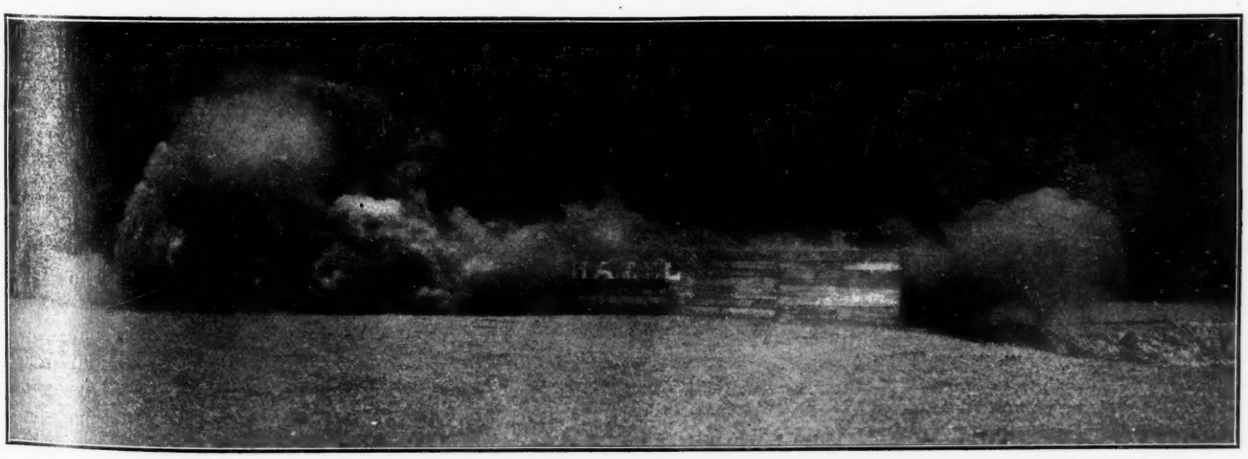
By G. B. Southward*

The First Annual First-Aid Field Contest of the southwest Virginia coal field was held at Big Stone Gap, Va., on July 2, 1915. The contest was under the auspices of the American Red Cross and the American Mine Safety Association and under the direction of Maj. R. U. Patterson, chief of the First-Aid Department of the American Red Cross, assisted by Dr. W. J. Shields of the same organization. In connection with the contest a mine explosion was demonstrated under the direction of E. B. Sutton, district engineer of the United States Bureau of Mines. The demonstration was given in a wooden gallery 85 ft. long, coal dust on shelves in the gallery being exploded by a cannon placed at one end.

Seventeen teams of white miners, representing the Clinchfield Coal Corporation, the Virginia Iron, Coal & Coke Co. and the Stonega Coke & Coal Co., were entered in the main contest. In addition to these, there were three colored teams of the Stonega Coke & Coal Co., who competed for a separate prize, and a boy-scout team of Stonega, Va., who gave an exhibition drill. The contest was witnessed by about 2000 spectators.

The contestants, headed by the Roda Band, marched onto the athletic field and took their stations in a continuous line

LAUREL TEAM OF THE CLINCHFIELD COAL CORPORATION



A DEMONSTRATION OF A COAL-DUST EXPLOSION IN THE WOOD GALLERY AT BIG STONE GAP, VA.

*Assistant engineer, Stonega Coke & Coal Co., Big Stone Gap, Va.

in front of the grand stand at 1:30 p.m. About 30 min. was allowed for the teams to make their preliminary arrangements, during which time a test was made in the gallery, permissible powder being used in the cannon. No explosion of the dust resulted.

Five problems were given, including one-man, two-man and full-team events. Five-minute intervals were allowed between numbers; but the contest lasted a little less than one hour. Immediately following the last event a second explosion test was made, the cannon being charged this time with black powder instead of permissible powder. A severe explosion of the coal dust resulted, forming a cloud of smoke and flame at the end of the gallery which rose to a height of over 50 ft. After the explosion the scores were read and prizes valued at $300 were distributed by Major Patterson to the twelve teams having the highest scores in the full-team events. Ten prizes were given for the one-man and two-man events.

The winners of the first three prizes for full-team scores and the best teams in the one-man and two-man events were as follows:

First full-team prize: Won by the Laurel team of the Clinchfield Coal Corporation; consisting of the Westinghouse three-year silver loving cup, the Provident silver loving cup, American Red Cross medals and certificates, American Mine Safety Association medals and $40 in cash. Score, 93 per cent.

Second full-team prize: Won by the Inman team of the Virginia Iron Coal & Coke Co.; consisting of American Red Cross medals and certificates and $35 in cash. Score, 90.2 per cent.

Third full-team prize: Won by the Keokee team of the Stonega Coke & Coal Co.; consisting of American Red Cross medals and certificates and $25 in cash. Score, 90 per cent.

First prize one-man event: Won by J. J. Strong of the Imboden team of the Stonega Coke & Coal Co.; consisting of a gold watch and chain and American Red Cross medals and certificates. Score, 98 per cent.

First prize two-man event: Won by A. H. Hurd and Clarence Aldridge of the Keokee team of the Stonega Coke and Coal Co.; prize consisting of American Red Cross medals and certificates, a thermos carafe and an electric chafing dish. Score, 95 per cent.

Meeting of Superintendents of Utah Fuel Co.

At the June meeting of the superintendents of the Utah Fuel Co. held at Winter Quarters 18 men of various official capacities discussed the subject, "Standardization of Material and Methods."

Before supper the visitors were taken into the mine and shown some of the first-aid stations, situated conveniently to the centers of greatest activity. These stations are built of concrete, generally in cross-cuts, and all the walls and approaches are whitewashed. These offices are kept warm and dry by electricity. They are equipped with a complete assortment of first-aid appliances and supplied with water.

After supper all attended a meeting of the Winter Quarters' First-Aid Society, held in the auditorium of the newly erected amusement hall. The report of the society for 1914 mentioned that members had rendered first aid in a large proportion of the accidents which had occurred in and around the mine, had rendered financial aid to unfortunates in the community and had sent money for the relief of the European war victims, in all a most commendable showing.

At the superintendents' meeting it was decided that as the study of "Standardization of Material and Methods" as applied to coal mining embraced such a wide variety of subjects no one man could handle it fully. Consequently each man was asked to "ride his hobby" for the benefit of the others. From the variety of subjects introduced, those which held the most promise for immediate improvement were selected and discussed in detail at once. The others were considered as occasion permitted during the progress of the meeting.

Suggestions for Standardizing Mine Materials

To report all the remarks of the 18 persons present would take too much space, so only a few of the points made will be mentioned. The suggestion was presented that a central warehouse or store be provided which would be stocked with standard supplies. It was shown that these articles could then be bought in such large quantities as to effect a saving in cost. From this storehouse all the mines could draw. It was shown that between 30 and 50 per cent. could be saved on first cost by buying some materials in large quantities, and that by adopting standards the money invested in repair parts could be greatly reduced. Moreover, using standard articles caused an indirect saving, because camps, in case of accident, could be supplied from each other.

To descend to detail, by buying in quantity and standardizing the use of lubricating oils large savings were possible. By using good material of standard sizes much saving could be made in mine props and ties. Good props properly placed would hold the roof weight better, permit greater recovery of pillars, and a large percentage of the props could be recovered and used again.

Similarly, inferior ties, even though much cheaper in first cost, were in the long run poor economy, for they did not make good tracks, as the spikes driven in them did not hold well and derailments were many. The ties did not last long and could not be used again. It was also important to have the right weight of rails and standard shapes, so that certain sizes of fish plates, bolts and track bonds could be used throughout the mines.

While it was generally agreed that many materials could be purchased to conform to a standard, the standardization of machinery presented many difficulties. Machinery is bought as necessity requires, and sometimes long periods of time elapse between purchases. During this time many improvements may have been made in the apparatus required. Such improvements may not, however, justify the expense of new equipment throughout, yet it might be obvious that it would not pay to duplicate the old, which time had already rendered absolete.

Bringing Food to a Standard

The local doctor lent interest to the meeting by suggesting the need of standardizing foods, especially milk and meat. The need of a clean, wholesome milk supply is apparent to those who come in contact with the children of a camp. Good milk is difficult to obtain. The amount of freshly killed meat, especially goat meat, that is peddled around the camps is large and its bad effect on the health of some of the foreigners is marked. The doctor said these subjects were important economically because the efficiency of the workman depended largely on his receiving proper nourishment. A well-nourished man makes the most efficient laborer, while one who lacks such support often "hits the booze."

Methods are much harder to standardize than materials, and much study is needed before they can be standardized. It was the sense of the meeting that each division of the subject be made a special study by men who were versed in it and that their recommendations be made the base on which the future standards will be prepared.

Discussion by Readers

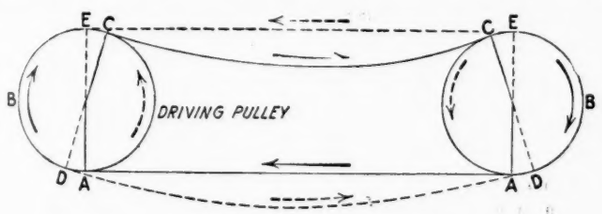
Mining Machinery--Belting

Letter No. 1—It has been suggested that much good can be derived from the discussion of the many practical points relating to mining machinery and equipment. One point that occurs to me, and which may prove interesting to others, is the adjustment, lacing and care of belts used for driving mine fans, pumps and other machinery.

Having spent much time in and about coal mines, I have observed that, as a rule, belts are not always used to the best advantage, and I offer the following suggestions that may be useful to the man who has belt trouble.

Except in the case of small belts driving light machinery, it is better to use a belt a little longer than necessary. In order to transmit the required power, the belt must exert a certain pressure on the pulley. In the use of a small belt this can only be obtained by stretching the belt tight. Such belts will generally be required to be tightened again, from time to time. A heavier belt, made somewhat longer than necessary, so that it operates with considerable slack, will give better results and require less attention than a tight belt.

There is an advantage in running a belt as nearly horizontal as possible, and whenever practicable the

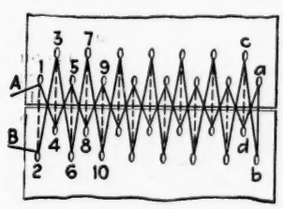


PROPER AND IMPROPER BELT-DRIVE

direction of rotation of the driving pulley should be such that the pull will be exerted on the lower side of the belt. As shown by the full lines in the accompanying figure, when the pull is on the lower side the upper side of the belt, in sagging, increases the arc of contact on both pulleys and gives greater force to the belt by decreasing its tendency to slip on the pulley. On the other hand, if the pull is exerted on the upper side of the belt, the sag of the lower side will decrease the arc of contact to the same extent that it was increased by the previous arrangement, as shown by the dotted lines in the figure. In the former case, the arc of contact on both pulleys is *CDE*, while in the latter case it is only *DBE*. The arrows indicate the direction in which the belt runs in each case.

It is generally better to have the belt made up endless, especially for a high speed; otherwise, lacing will be necessary, and this must be properly executed. To lace a belt, two rows of holes must be punched in each end of the belt, these holes being staggered so as not to be opposite each other in any two adjacent rows. In order to reduce the tendency of the holes to tear out, an oval punch should be used. The edge of the first row of holes must not be closer than ¾ in. from the end of the belt, and the two rows of holes should be about 1 in. apart, center to center. Practically, the same distance must be preserved between the edges of the outer holes and the edges of the belt.

A good form of lacing is shown in Fig. 2. Starting at the left side of the belt, the lace *A* is entered the hole marked 1 from the upper side of the belt and carried underneath to the hole marked 2, as indicated by the dotted lines. It is then passed through hole 2 and carried on the upper side of the belt to the third hole, and thence on the under side to the fourth hole. In this manner the lacing is carried across the entire width of the belt. On arriving at the right side of the belt, the lace is passed through hole *a* and back through hole *b* twice, after which it is carried on the upper side of the belt to hole *c* and underneath to hole *d*. In the same manner the lacing is carried to the left side of the belt where the end *B* of the lace emerges from hole 2 on the upper side. The two ends *A* and *B* are then securely tied together on the upper side of the belt.



SHOWING GOOD METHOD OF LACING A BELT

There is thus formed on the under side of the belt a double lace passing from hole to hole in straight lines parallel to the length of the belt. There must be no crossing of the laces on the under side of the belt. The hair side of the belt should always be run next to the pulley, as being smoother it gives more perfect contact with the face of the pulley. No oil should be allowed to come in contact with rubber belting, but should there be any oil on the belt, it can be removed with turpentine. Only tallow or castor oil should be used on leather belting, and this but sparingly.

CHIEF ELECTRICIAN.

Logan, W. Va.

Stopping Payroll Leaks

Letter No. 6—In connection with the interesting letters on "Stopping Payroll Leaks," it occurs to me that many small pick mines, employing mule haulage and managed by competent mine foremen, will often put coal on the tipple much cheaper than some larger mines employing electric-haulage motors and cutting machines. There are no doubt several reasons for the higher cost of production at these larger mines; but I believe the most important factor in increasing the cost of operation is the upkeep of the electrical equipment of the mine, especially the bonding of the rails. Attention was drawn in Letter No. 3, May 22, p. 901, to a serious leakage of the electric current owing to the poor installation of the trolley-wire hangers inserted in the roof of the entry and causing a loss of hundreds of dollars a month.

I have been chief electrician and master mechanic for different coal companies for a long time, and in every instance but one the mine foreman had charge of the bonding of the rails on the main-haulage road. Among all these foremen I only recall one who realized or cared to realize the importance of good bonding. In some cases this work was entirely neglected with the idea of avoiding "unnecessary expense underground." The foreman, if he knew, entirely ignored the fact that this saving of expense underground was the direct cause of a much heavier expense in the power house, due to the burning out of armatures, field coils and controllers, for which the mine electrician would be responsible, in his opinion. It is needless to remark that under these conditions the company could have saved at least the electrician's salary, by giving the mine foreman charge of the entire equipment, since no expert knowledge is required to replace an injured part with a duplicate piece.

Only recently I accepted a position as chief electrician with a company operating several mines. Each mine was in charge of a mine boss, having a mine mechanic under him. Because of troubles in the electrical equipment, resulting in a high cost of production, the mine manager decided to employ a chief electrician, and I was selected for that place. Owing, however, to the fear of producing friction underground, the mine foreman still had charge of the rail bonding in the mine. It soon developed that the mine foreman of one of these mines was getting better results when he broke all past records by putting his coal on the tipple at a minimum cost.

It appeared, also, that the miners working in that mine were always satisfied and contented. They knew that when they reported for work in the morning they would not be sent home because of a breakdown of a haulage motor, cutting machine or other portion of the equipment. The foreman of this mine was a competent man, who always put the company's interest foremost and gave close attention to every mechanical detail underground, including the bonding of the rails.

In strong contrast with this favorable condition there was considerable trouble in the adjoining mines where the foremen did not give the same close attention to the smaller details of the mine equipment. The bonding of the rails was thought to be almost useless, and little effort was made to keep it in order. Starting from the mine entrance, one could find many joints too hot to bear the hand. In one case the foreman remarked that the bonding on the main road he thought was good, but he did not intend to give any attention to the bonding of headings where machines were cutting, as he thought it was unnecessary.

At another time a voltmeter gave a reading of only 180 volts on a 250-volt circuit, at a point 6000 ft. from the entrance to the mine. There were three gathering motors at work inby from this point, while a 10-ton motor was employed to haul the loaded trips to the tipple. When the motor on the main road started to haul its trip to the surface, the pressure would drop to 80 volts and remain so for five or eight minutes. During that time the small gathering motors could not move.

In this mine the trolley wire on the gathering haul was in such bad shape that the mortormen did not attempt to use the trolley poles, preferring to operate their motors with the cable from the gathering reel. Since there were in all ten gathering motors in this mine doing the same thing, it can well be imagined that this was an expensive proposition for the company, resulting frequently in the burning out of armatures and controllers and causing other troubles. The cutting machines had to work with such low voltage that it took but a short time to burn out the fuses and armatures on those machines, making the expense for maintenance shamefully high and causing much unpleasantness for all concerned.

In my opinion, with proper bonding alone in this mine, the cost of putting the coal on the tipple would have been 10 or 11c. per car less, or about 4c. per ton less than under the prevailing conditions. Assuming the mine ran only 20 days in the month, this would mean a saving of $800 a month.

The trouble to which I have referred is a common one, and the instances cited show the saving that could be effected by employing a competent electrician and giving him charge of the entire electrical equipment, both on the surface and underground. It is manifestly unfair to hold an electrician responsible for results that are due to another man's neglect. It does not appear to me that there is any cause for friction when the bonding of the rails is in charge of a competent electrician, instead of being left to the mine foreman to look after, who is not particularly concerned in the trouble his neglect causes in the power house, and elsewhere, for which he will not be directly to blame, according to his reasoning.

Successful operation demands that all mine work be classified and a competent man be placed in charge of each kind of work for which he is particularly fitted, and made responsible. To obtain competent men, I believe examinations should be held, covering each class of work, and certificates of competency given to candidates who pass a successful examination.

C. J. FUETTER.

Millwood, Penn.

Success in First-Aid Work

In passing judgement on events that have taken place, different individuals arrive at different conclusions because they view the events from different standpoints or angles. I was impressed with this fact when reading accounts of the recent field meet held at Birmingham, May 29, under the auspieces of the Alabama Safety Association and other similar organizations, both local and national.

According to the officials, this was the most successful first-aid meet ever held in this country. On the other hand, I have heard a great many criticise the work that was done and the manner in which it was judged by those appointed to pass on the merits of the different teams taking part in the contest. I notice that a brief comment in *Coal Age*, June 19, p. 1065, offered the same criticism of some of the judges. My observations at the time inclines me to the belief that these criticisms were not nearly severe enough.

I do not like to think that these organizations, formed for the benefit of the hard-working classes, comprise among their officers an exclusive aristocracy. It is to be hoped that this is not the case, for the sake of the future success of the first-aid movement.

Before giving the results of my observation on the field I want to ask, What constitutes a successful meet? Is it the number of teams contesting, or is it the quality

and proficiency of the work they perform? Numbers undoubtedly lend enthusiasm to a movement, but few will deny that the quality of the work done by the teams, and its manner of execution, are the factors that truly measure the success of the undertaking. Then, again, is it fair for those who have prepared themselves to enter such a contest to have their work judged by men whose knowledge of the requirements of the contest and the aims sought to be attained is doubtful?

For the good that it may do, I want to state briefly how this meet appealed to me and to a great many others who were present though not participating in the event. It will be readily agreed that the rules drawn up to govern the contest should be rigidly enforced. The judges should be familiar with these rules and should base their judgement on the manner in which the different teams conform to the regulations. In this connection, I will cite a single instance.

I noticed that many of the negroes who had entered the contest were working with their bandages, splints, etc., all ready prepared, and that some of the white teams were doing the same thing. Believing that the best interests of the first-aid work should be carefully watched, I reported my observations to the chairman of the meet. He did not seem too well pleased, and replied, "We can't look into all the details." I have always thought that the details of first-aid work were what counted. But the tone and manner of the chairman told me that further suggestions were not acceptable. I found, a little later, that many of the judges were giving credits for work performed by the teams that, in truth, should have been penalized.

I want to suggest further that the spectators, in this case, were kept at too great a distance to observe closely how the work was done and benefit thereby. One of the objects of the meet should be the education of the onlookers. We should not forget, also, that the children of today are the men and women of tomorrow; and these should be invited and permitted to see how the work is performed. If we are in earnest in securing the best results of this movement, we must remember that the greatest success can only be attained when everyone in an industrial community is in harmony with the objects sought and the manner of their accomplishment.

WILLIAM CROOKS.

Ensley, Ala.

Preventing Mine Explosions

Letter No. 4—I say, with Mr. Rose, *Coal Age*, May 8, p. 819, that in all mines wherein explosive gas is given off in sufficient quantities to warrant its being designated as "gaseous," there will continue to be explosions until certain practices that now exist are eliminated. According to methods based on practical principles, a mine is pronounced "in safe condition when free from gas." This report is the result of a recent examination in which no explosive mixture was detected at any point in the mine. Nevertheless, the air current in this mine may be quickly converted from a so-called "safe condition," to a highly dangerous condition as the result of many common causes, such as a sudden decrease in the supply of fresh air, owing it may be to a door or regulator being left open or changed, or to an increase in the amount of gas owing to fresh feeders being tapped.

Now, with the present standard of efficiency in the ventilation of mines required by the laws of Pennsylvania, and mine-foremen and firebosses discharging their respective duties faithfully and using no other light than an approved safety lamp in examining the mine, and all shots being fired by competent shotfirers, after the men have left the mine, and compressed air being used as a substitute for electricity, the liability to gas explosions will be reduced to a minimum. The objections made to these suggestions will no doubt be many and come from operators and miners having only their own personal gain in view, but it must be admitted by all fair-minded thinkers that their general adoption would add to the safety and welfare of all concerned.

ROBT. BROWN.

Bolivar, Penn.

Mining Laws and Legislation

Letter No. 7—I have been much interested in the letters relating to the legal responsibility of the assistant mine foreman under the Pennsylvania mine law. Reference has been made to the suit instituted a short time ago by a district mine inspector against Assistant Mine Foreman Joseph Willis, charging him with neglect of duty in failing to see that suitable timbers were set in a room where a miner was killed while at work, by a fall of slate. It developed that the assistant foreman had instructed the miner to set the necessary props as he had some bad roof in his room. The miner neglected to do as he had been instructed, with the result that he was crushed to death by the fall that took place shortly after these instructions were given.

The question in my mind is, Can this assistant foreman be held responsible for the neglect of the miner, after having given him instructions to make his place safe? The Pennsylvania bituminous law (1911), art. 25, rule 1, states as follows:

> The miner shall examine his working place before beginning work and take down all dangerous slate, or otherwise make it safe by properly timbering it, before commencing to mine or load coal. . . . The miner shall at all times be careful to keep his working place in a safe condition during working hours.
>
> Should he at any time find his place becoming dangerous, . . . he shall at once cease working and inform the mine foreman or the assistant mine foreman of said danger, etc. . . . He shall order all props, cap pieces, and other timbers necessary, at least one day in advance of needing them. . . . If he fails to receive said timbers and finds his place unsafe, he shall vacate it until the necessary timbers are supplied.

These rules and regulations are, or should be, posted at every mine, printed in different languages, so that each miner can read them and know that he has duties to perform, the same as the mine foreman and his assistant.

If the miner, therefore, neglects to do his duty after receiving instructions from his foreman or an assistant, he is responsible for any accident that may result from such neglect. As I said before, I fail to see how a mine foreman or his assistant can be held responsible for the miner's neglect, after he has performed his duty by instructing the miner to make his place safe.

The mine inspector is often prone to require more of the mine foreman and his assistant than can be naturally expected of these officials. Too often the entire responsibility for an accident is laid on the shoulders of the mine foreman or his assistant, the mine inspector claiming that the mine foreman should see that his instructions

are carried out. I would ask, Does the mine inspector himself follow the same rule? He calls the mine foreman's attention to a violation of the law, or unsafe condition, and takes it for granted that the matter will be remedied before his next visit. Could it be expected that he would remain at the mine to see that his orders are carried out promptly? It would be just as unwise to expect the mine foreman or assistant foreman to remain in a single place to see that his instructions are promptly obeyed.

If the foreman or his assistant is to be held responsible for accidents resulting from the neglect of workmen to obey his instructions, it follows that the mine inspector should likewise be held responsible for accidents resulting from the neglect of mine officials to comply with his orders. If a foreman or his assistant were compelled to stay and see that his instructions were obeyed, he could not complete his rounds; but the law places this responsibility on the miner, who must obey the instructions given him, as required in art. 4, sec. 9, which reads as follows:

. . . Any workman who neglects to carry out, or disobeys the instructions of the mine foreman or his assistant, in regard to securing his working place, shall be suspended or discharged by the mine foreman, and if such negligence or disobedience results in serious injury or loss of life to any person, the mine foreman shall give the name of said workman to the inspector for prosecution in accordance with sec. 2, art. 26, of this act.

Art. 26, sec. 2, reads as follows:

Any person who neglects or refuses to perform the duties required of him by this act, or who violates any of the provisions or requirements thereof, shall be deemed guilty of a misdemeanor and shall, upon conviction thereof, in the Court of Quarter Sessions of the county in which the misdemeanor was committed, be punished by a fine not exceeding $200, or imprisonment in the county jail for a period not exceeding three months, or both, at the discretion of the court.

I would ask, If a miner is held legally responsibile for the death of another person resulting from his own neglect, why should he not be responsible for his own death resulting from such neglect?

I am a firm believer in a uniform system of timbering. I believe each miner should be instructed by his foreman or assistant in regard to the system of timbering adopted in the mine. If a miner fails to carry out these instructions, he should be suspended or discharged; and, in case of accident resulting from such neglect, he should be prosecuted, as required by law. If this were done, more heed would be given by the miners to their instructions, and there would be fewer accidents at the working face. I hope to hear from other mine foremen and assistants along the same line.

OLIVER YOUNG, Assistant Mine Foreman,
Cowanshannock Coal & Coke Co.
Nu Mine, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Method of Calculation—The calculation of the heat of combustion from the heats of combination of the combustible and the several products formed, will be best understood by a practical illustration following the statement of a few fundamental principles that always govern the operation. Briefly stated these are as follows:

1. No heat energy is lost, but the heat of an element, in any reaction, is zero, there being neither combination nor dissociation possible in the element as in a compound.
2. Total heat of formation of products is the **positive (+) heat** developed in the reaction.
3. Heat of decomposition (same as heat of formation) of the combustible is the **negative (—) heat** or the heat absorbed in the reaction.
4. The heat of combustion is the **net heat**, or the difference between the total heat in the products and the heat in the combustible.
5. The reaction generates heat, or is **exothermic**, when there is an excess of positive (+) heat.
6. The reaction absorbs heat, or is **endothermic**, when there is an excess of negative (—) heat.

Note—The **chemical equation** expressing a reaction shows the equivalence of weight of matter before and after reaction, but does not show the thermal effect.

A **thermochemical equation** is written by adding to the chemical equation a positive or a negative term indicating the heat generated or absorbed in the reaction. This heat may be expressed as "gram-calories," "kilogram-calories," or "pound-calories," according as the weight of the combustible taken is a gram-molecule, a kilogram-molecule or a pound-molecule. Or, the heat of the reaction may be given as B.t.u. per pound, or other denomination. The weight-unit is immaterial, since the **heat of the reaction** is always that due to the molecular weight of the combustible expressed in the same weight-unit.

The amount of heat corresponding to the molecular weight of the combustible (expressed in any weight-unit) is frequently called the **"molecular heat"** of the reaction.

The molecular heat of a chemical reaction, divided by the molecular weight of the substance consumed, gives the heat of the reaction per unit weight of substance, which is the heat of the combustion expressed in the same denomination as the weight of the substance.

Illustration—The heat of combustion of methane (CH_4), as determined by Favre and Silbermann (See Table), is 23,513 B.t.u. per lb.; or $23{,}513 \times {}^{5}/_{9} = 13{,}063$ lb.-cal. per lb.; or 13,063 kg.-cal. per kg., or grm.-cal. per grm. of the gas.

The molecular heat of this reaction is therefore

$$16 \times 23{,}513 = 376{,}208 \text{ B.t.u.}$$

or

$$16 \times 13{,}063 = 209{,}008 \text{ cal.}$$

It is observed, thus, that the molecular heat, in the combustion of methane, is the heat (B.t.u.) generated by 16 lb. of the gas; or the heat (lb.-cal.) generated by the 16 lb.; or the heat (kg.-cal.) due to 16 kg.; or the heat (grm.-cal.) due to 16 grm. of this gas. Different authorities have obtained slightly varying heat values of the gases.

The Coal Age Pocket Book

Writing a Thermochemical Equation—The thermochemical equation expressing the reaction that takes place and the heat that is generated in the combustion of methane (CH_4) is written thus:

$$CH_4 + 2\,O_2 = CO_2 + 2\,H_2O - 388{,}100 \text{ B.t.u.}$$

Or, in the French system,

$$CH_4 + 2\,O_2 = CO_2 + 2\,H_2O - 215{,}600 \text{ cal.}$$

The reaction is exothermic, or generates heat, which is the excess of the heats of formation of the products of the combustion (carbon dioxide and water), over the heat of formation of the combustible (methane).

Likewise, for the combustion of carbon to carbon dioxide, which generates 14,550 B.t.u. per lb., or $14{,}550 \times {}^{5}/_{9} = 8083$ cal., the molecular heat of the reaction is $12 \times 14{,}550 = 174{,}600$ B.t.u., or $12 \times 8083 =$ say 97,000 cal. The thermochemical equation expressing this combustion is

$$C + O_2 = CO_2 - 174{,}600 \text{ B.t.u.}$$

or

$$C + O_2 = CO_2 - 97{,}000 \text{ cal.}$$

In these equations, the heat of combustion is equal to the heat of formation of the product (carbon dioxide), the heats of the elements (carbon and oxygen) being zero.

Heats of Formation of Substances—The heats of formation of a few substances that are of interest in mining are given in the following table. The heats are given as molecular heats for convenience of substitution in equations.

TABLE OF HEATS OF FORMATION OF SUBSTANCES

Substance	Symbol	Molecular Heats of Formation B.t.u.	Cal.
Methane	CH_4	39,060	21,700
Acetylene	C_2H_2	98,550	54,750
Ethene (olefiant gas)	C_2H_4	—20,250	—11,250
Ethane	C_2H_6	47,970	26,650
Carbon monoxide	CO	52,200	29,000
Carbon dioxide	CO_2	174,600	97,000
Hydrogen sulphide	H_2S	8,640	4,800
Sulphur dioxide	SO_2	124,668	69,260
Ice (32° F.)	H_2O	128,880	71,600
Water (32° F.)	H_2O	126,288	70,160
Water (212° F.)	H_2O	123,048	68,360
Steam (212° F.)	H_2O	105,660	58,700

For the most part, the heat values in the above table have been determined by experiment, by means of the calorimeter. The values of the heats of combustion, as calculated from these molecular heats of formation, by substitution in the chemical equation expressing the reaction, will not be found to check the earlier determinations of Favre and Silbermann; but the variation is slight.

For example, writing the thermochemical equation for the combustion of methane, indicating the required heat of combustion by x, we have

$$CH_4 + 2\,O_2 = CO_2 + 2\,H_2O - x$$
$$39{,}060 + 0 = 174{,}600 + 2(126{,}288) - x$$
$$x = 174{,}600 + 2(126{,}288) - 39{,}060 = 388{,}116 \text{ B.t.u.}$$

Then, the molecular weight of methane being 16, the unit heat of combustion is $388{,}116 \div 16 = 24{,}257$, instead of 23,513 B.t.u.

Inquiries of General Interest

A Dangerous Condition

We have recently been facing what some have advised was a dangerous condition in one of our mines. The seam is 12 ft. in thickness, and has an inclination of 21 deg. The coal is bituminous, low in volatile matter, and fairly hard. There is more or less fireclay in the bottom, while the top is hard and does not break readily.

At the present time the mine has been developed to its full extent and work in the lower part of the mine has been abandoned. The work of drawing the pillars in the upper portion has been progressing, until we have reached a point where it has seemed doubtful whether this work can be continued much farther with safety.

There is naturally an inclination on our part to go as far as it would be considered safe, and perhaps even to take chances that may seem unwarranted to an unprejudiced mind.

Now, I would like to ask, Are there not some readers of *Coal Age* who have had just such experience in the working of a thick seam of coal on a considerable inclination under a hard roof that would not break? If there are any such I would very much appreciate learning of their experience, and receiving from them suggestions of what in their best judgment is the safest method to pursue, or whether it would be dangerous or assuming an unwarranted risk to continue to draw the pillars in the upper portion of the mine.

The mine to which I refer has been opened by a slope driven on the full dip of the seam and having a total length of practically 5000 ft. This main slope is used as a haulage road, and is flanked on either side with a pair of entries, which are used for ventilation, drainage and manways. These main-slope headings thus consist of five parallel entries. Cross-headings or levels are driven to the right and left of these slope entries, every 100 yd. on the strike of the seam, and rooms turned to the rise off these levels.

The surface being generally level, the depth of cover at the foot of the slope was practically from 500 to 600 yd. It would seem that there should be some practical method that could be adopted for the more or less complete extraction of the coal left in the pillars.

GENERAL SUPERINTENDENT.

——, Alberta, Canada.

The above inquiry presents a practical question of great interest in coal mining. The conditions described duplicate to a considerable extent those recently discussed in *Coal Age* in reference to the Pittsburgh seam, known as the No. 8 seam in Ohio. The discussion in that case referred to the question as to whether that seam could be worked successfully by the longwall method of mining. The case considered in the above inquiry, however, refers to a fully developed mine, in which the work of drawing back the pillars is in progress, with the result that no satisfactory break of the roof has been secured, and the question of the safe continuance of the work is in considerable doubt. Let the readers of *Coal Age,* many of whom have had experience under similar circumstances, say what, in their judgment, is best or safe.

Variation in Line Drop

Kindly answer in *Coal Age* the following question which has puzzled me:

If the drop on a given section of road where electric haulage is employed is 50 volts when the load is uniformly distributed, what will it be if the whole load is concentrated at the end of the line? Explain fully.

ELECTRICIAN.

Linton, Ind.

In answer to this question it may be stated that a uniformly distributed load in electric haulage is equivalent, in respect to the total resistance or line drop, to the same load concentrated at the center of the line. Also, the line drop is always proportional to the resistance of the line, and this resistance is proportional to the distance of the load from the power station. Hence, a load at the end of the line will cause a line drop of twice that due to the same load at the half-way point.

Therefore it may be said that if the line drop is 50 volts when the load is uniformly distributed, the drop will be double this amount, or 100 volts, when the same load is concentrated at the end of the line.

This answer, of course, is only approximately true, since there are numerous causes in electric haulage that operate to modify both the resistance and the consequent line drop. Such modifications, however, would have to be considered in detail, involving data not given.

A Question on Heat

How much heat will be required to convert 10 lb. of ice, at a temperature of 18 deg. F., into steam, at an absolute pressure of 30 lb. per sq.in.?

JOSEPH J. DOROTINSKY.

Waltersburg, Penn.

The specific heat of ice being 0.504, the heat absorbed for a rise of temperature from 18 deg. to 32 deg. F. is 0.504 (32 — 18) = say 7 B.t.u. per lb. To this must be added the latent heat of ice, or the heat absorbed in melting (144 B.t.u. per lb.), which gives for the total heat absorbed when the ice has melted 7 + 144 = 151 B.t.u. per lb. The total heat above 32 deg. F., in steam at 30 lb. absolute pressure, as taken from steam tables (Marks and Davis), is 1164 B.t.u. per lb., which makes the total heat required to convert 10 lb. of ice, at 18 deg. F., into steam at 30 lb. absolute pressure,

$$10\ (151 + 1164) = 13{,}150\ B.t.u.$$

Or, since latent heat of steam is 966 B.t.u., specific heat 0.48, and temperature at 30 lb. pressure, 250 deg F., the same result is obtained thus: $10[151 + (212 - 32) + 966 + 0.48\ (250 - 212)] = 13{,}150\ B.t.u.$

Examination Questions

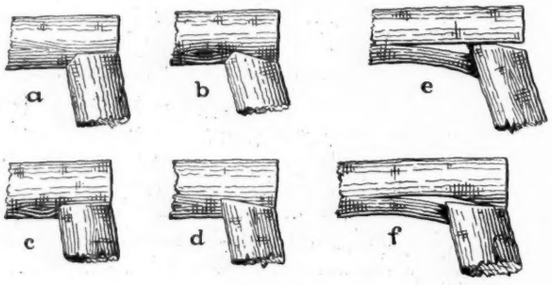
Alberta (Canada) Examination, June 15-17, 1915

(*Selected Questions*)

Ques.—When is it necessary to notch timber? Sketch and describe the correct and incorrect methods of making two notches with which you are acquainted. Show by sketches the effect of improper notching on the life of mine timber.

Ans.—All timbers forming a part of a timber frame should be notched.

In the accompanying figure are shown two methods (*a* and *b*) in quite common use for notching mine timbers when timbering airways and haulage roads. The method shown at *a* presents a horizontal bearing surface for the top of the leg, while that at *b* is inclined. In



PROPER AND IMPROPER METHODS OF NOTCHING MINE TIMBERS

both of these methods, the notch is cut at an angle with the axis of the collar, which is correct. The method shown at *a*, however, is preferable as the bearing surface is there at right angles to the direction of the roof pressure.

At *c* and *d* are shown the incorrect methods of making the two notches just described. The notch at *c* is cut at right angles to the axis of the collar instead of being cut at an angle, as shown at *a*. The notch at *d* is cut forward in the collar so that it is nearly parallel to the axis of the leg. Both of these methods present more or less of a tendency to split the collar, as shown at *e* and *f*.

Ques.—What is the total pressure at the bottom of a pipe full of water, 10 in. in diameter and 600 ft. high?

Ans.—The pressure due to a head of water of 600 ft. is $600 \times 0.434 = 260.4$ lb. per sq.in. The total pressure exerted on the sectional area at the bottom of a 10-in. pipe is therefore $260.4(0.7854 \times 10^2) = 20{,}451.8$ lb., or nearly 10¼ tons.

Ques.—Describe the danger that attends the use of electricity in and about coal mines and the safeguards necessary.

Ans.—The principal dangers from the installation of electricity in coal mines are contact of men or animals with live wires and ignition of gas or combustible material by the sparking of wires, short-circuiting of the current, burning out of fuses, etc. To avoid the danger of contact, all live wires should be properly safeguarded by a suitable installation of the wires or by the necessary protection of the trolley wire at all points where men or animals are liable to come into contact with the same. Men or animals should not be allowed to travel on entries or haulage roads where trolley or other live wires are installed. All electric installations should be made by a competent electrician, and switchboards and other electrical appliances should be in charge of competent men and inspected daily.

Ques.—Define the terms "force," "work," "foot-pounds" and "horsepower."

Ans.—The term "force" describes any agency that produces or tends to produce any change in the condition or state of matter, whether physical, mechanical, electrical, chemical or magnetic.

The term "work," in mechanics, describes the result of a force acting through a certain distance. The work performed is measured by the product of these two factors.

The term "foot-pounds" expresses the measure of a given work, as being the product of the distance, in feet, and the force exerted, in pounds.

The term "horsepower" is the mechanical unit of power in common use and is equal to 33,000 ft.-lb. per min. It expresses the work performed in a unit of time and assumes that the average work of a horse is 33,000 ft.-lb. per min.

Ques.—Describe how you would examine a steel wire hoisting or haulage rope, and mention where defects are most likely to be found. How would you protect the rope in a wet shaft or slope?

Ans.—A wire hoisting or haulage rope must be carefully examined at regular short intervals for any broken or defective strands that are badly worn and liable to break. A common practice is to allow the rope to pass slowly through a bunch of oily waste held in the hand. This, however, will only detect strands that are broken and protruding from the rope. All hoisting ropes especially should be more carefully examined, to ascertain the amount of the wear of the outer strands. All ropes used on haulage slopes should be examined in the same manner. Special attention should be given to that part of the rope within a few feet of the end couplings, which is more liable to be injured by the kinking of the rope when slack is given. Also, that portion of the rope resting on top of the head-sheave and exposed to the weather when the cage is at the shaft bottom or at the upper landing should be carefully examined. This portion of the rope is also subject to greater strain, owing to the additional bending stress at the moment the load is being started from the bottom of the shaft.

To protect a rope in a wet shaft or slope, it should be treated with an application of tar, boiled oil or other dope that will penetrate the rope and protect the strands from the corrosive action of the mine water. Such application should be made as the conditions require.

Coal and Coke News

Washington, D. C.

Figures prepared by the Department of Commerce for May and the 11 months ending with May and showing exports of coal from the United States for the periods in question have just been issued. These show the following results:

Countries to Which Exported	May 1914 Tons	May 1914 Value	May 1915 Tons	May 1915 Value	Eleven Months Ending May 1913 Tons	1913 Value	1914 Tons	1914 Value	1915 Tons	1915 Value
Anthracite—										
Canada	469,441	$2,524,181	412,479	$2,137,483	4,131,075	$21,936,325	3,469,646	$18,274,302	3,269,000	$17,249,269
Uruguay	.....	.....	.....	.....	.....	.....	84	559	.....	.....
Other countries	6,042	30,435	10,215	46,202	73,741	371,012	56,119	276,863	60,552	284,392
Total	475,483	$2,554,616	422,694	$2,183,685	4,204,816	$22,307,337	3,525,849	$18,551,724	3,329,552	$17,533,661
Bituminous—										
Italy	.....	.....	285,027	$845,870	.....	.....	.....	.....	1,245,260	$3,724,408
Canada	705,562	$10,572,992	589,512	1,256,291	10,563,330	$25,836,505	10,678,541	$24,950,666	7,551,864	16,478,270
Panama	22,150	59,805	34,321	93,869	443,249	1,196,448	336,617	910,602	295,664	808,588
Mexico	20,951	89,285	30,247	132,235	406,249	1,136,658	280,526	962,445	369,166	1,616,242
Cuba	82,851	231,042	107,650	297,228	1,167,681	3,136,986	1,048,379	2,914,352	990,222	2,781,770
Other West Indies and Bermuda	50,824	153,120	34,471	102,827	550,055	1,551,019	532,108	1,560,854	413,486	1,262,727
Argentina	11,078	34,852	108,730	322,930	.....	.....	129,432	371,536	406,058	1,224,286
Brazil	16,391	55,842	65,183	198,430	.....	.....	229,059	732,495	404,780	1,235,894
Uruguay	11,581	34,743	14,401	42,280	.....	.....	56,252	165,292	91,671	268,272
Other countries	162,425	478,615	134,735	396,830	1,060,966	3,059,127	1,228,486	3,623,106	711,414	2,114,894
Total	1,083,813	$2,710,296	1,404,277	$3,688,790	14,191,530	$35,916,743	14,519,400	$36,191,348	12,479,585	$31,515,351

The showing indicates unexpected improvement in May as compared with conditions previously existing during this fiscal year; and on the strength of this some people are again predicting large development of the export trade in coal.

The following study of the bunker coal situation at the Panama Canal has been issued by the Isthmian canal commission which calls attention to the requirement of additional equipment to meet needs prior to the completion of permanent plants.

The difficulties of coaling vessels promptly at Cristobal, which have been experienced as the result of the increasing demands of vessels and the noncompletion of the permanent coaling plants, have been lessened by the use, in addition to the previous facilities, of four motor-driven conveyors, or hoisters, which are used to discharge coal from barges and lighters alongside vessels into their bunkers. Two 500-ton barges have been fitted for this service, each with two conveyors. The conveyors are of the Demayo make and consist essentially of an endless chain of scoops, operating in a vertical steel casing about 25 ft. high, from the top of which the material being handled is discharged into a pipe chute, passing by gravity to its destination. The elevators are suspended by cables from booms. This regulates their elevation while they dig into the coal and allows their being swung about to reach any point in the hold of the barge.

The first use of this new equipment on commercial vessels was in the coaling of the steamship "Finland" of the Panama Pacific Line, which passed through the Canal on her way from New York to San Francisco on June 24. On the second vessel coaled, the "Guatemala" of the Pacific Steam Navigation Co., the rate of supply was 26½ tons per hour. This is regarded as low for this equipment, and it is expected that when the operators shall have become thoroughly trained to their work each barge will supply approximately 60 tons per hour. If such effectiveness be attained the facilities for bunkering at Cristobal will have been practically quadrupled.

In the mean time, work is being pushed on the permanent coaling plant for the Atlantic entrance as rapidly as the material is supplied by the contractors. It is planned to complete two of the four unloader towers in September, and, by a modification of their construction, use them for both unloading colliers and loading into customer vessels from the stock pile. This is a temporary expedient, for use only until the regular reloader towers shall be completed, but as the two towers command a considerable storage space and each will be capable of handling about 250 tons an hour, it will in all probability meet the situation quite satisfactorily until the completed plant is in service.

All four of the towers for the plant have been erected, but the two toward the outer end of the wharf are those on which early completion is being pushed. The two stocking and reclaiming bridges have been practically completed with respect to the structural work, but the machinery is yet to be installed. They will probably be completed by the end of September. The material for the reloader towers has begun to arrive from the United States and their erection will begin shortly. The viaduct commanding the dry storage space is about 50 per cent. completed. The dredging alongside the wharves has advanced sufficiently to allow vessels access to the plant whenever desired.

At the Pacific plant, one of the two unloader towers is practically erected, and all four of the berm cranes, which will be used for stocking and reclaiming, have been erected. Work has not begun on the two reloaders, the wharf for which is yet to be built; the sinking of caissons for this wharf is in progress. This construction is intimately related to that of the drydock, as the coaling plant will form one side of the entrance slip to the dry dock, and the work is held back somewhat by the need of the dry dock construction.

HARRISBURG, PENN.

The Public Service Commission has held in the case of the Pittsburgh Plate Glass Co. against the Pennsylvania R.R. Co., that the collection of demurrage on the shipments complained of was not provided for by the tariffs of the respondent in force at the time of the complaint.

The Pittsburgh Glass Co. complained that the Pennsylvania R.R. Co. was charging and collecting from it demurrage upon loaded coal cars belonging to the glass company, transported by the railroad company from the mines of the glass company, and placed upon the private siding of said glass company, at its factory, at West Tarentum.

The complainant is the owner of a plate glass factory. It owns also a coal mine ¾ mile away, from which it ships the coal needed in the factory, on the line of the respondent railroad. It owns also a number of steel hopper cars in which the coal is shipped and which are used exclusively for this purpose. The railroad company charges the regular tariff rates for the transportation, making allowance to the glass company of 0.6c. per mile for each car. The railroad company charged a demurrage for these cars at the rate of $1 per car per day while these cars, after delivery, stand loaded upon the tracks of the complainant constructed by it upon its own property. It is the charge of demurrage to which the glass company objected. The general rules respecting demurrage, which have met the approval of the Interstate Commerce Commission, provide as follows: "Private cars while in railroad service, whether on railroad company or private tracks, are subject to these demurrage rules, to the same extent as cars of railroad ownership. Empty private cars are in railroad service from the time they are placed by the railroad company for loading or tendered for loading on the orders of the shipper. Private cars under lading are in railroad service until the lading is removed and cars are regularly released."

The Commission decided that this was a case which ought to be decided upon its own facts, and these facts distinguish it from most, if not all others which have been heretofore determined. It was contended for the railroad company first, that the case of the glass company is within the language of the above cited rule; second, that certain authorities which were cited have determined the question here raised upon principal in favor of the railroad company.

The commissioners decided that the facts presented did not show the cars were in the service of the carrier. They could not be used by the carrier for any other purpose than the service of the complainant. At the time the demurrage was attempted to be imposed, these cars had been delivered to the complainant and were its own cars, filled with its own commodities (coal) upon its own tracks. The railroad company denied any liability for the cars or lading after delivery upon the owner's siding. Under these circumstances the Commission holds that the enforcement of demurrage seems entirely to fail. Its enforcement could not compel the prompt return of the cars. The railroad company had no right of any kind to the cars, their use or possession. The glass company after unloading might retain the cars and never return them. No right to possession upon the part of the railroad could in any way be maintained. The argument

that the carrier ought to be enabled to know upon how many private cars it may depend in order that it may secure sufficient other cars for its service, is not sustained by the Commission, because these cars could never have been depended upon for such service and the railroad company could not have been misled.

The Commission held that the language of the general demurrage rule does not specifically refer to the case of the delivery of cars to their owner upon his own tracks, and ordered the railroad company to cease and desist from charging and collecting from the glass company demurrage upon the loaded coal cars of the glass company transported by the Pennsylvania R.R. Co. from the mines of the glass company and placed upon the private siding of the glass company at its glass factories.

PENNSYLVANIA

Anthracite

Shenandoah—Two miners, Thomas Murt and Michael Laura, were recently entombed in the Knickerbocker colliery of the Philadelphia & Reading Coal & Iron Co. from seven o'clock in the evening until one o'clock the next morning. The accident was due to a fall of top coal covering a distance of 100 ft. Officials of the company arrived on the scene promptly and immediately instituted extensive measures for rescue. These were exceedingly dangerous, on account of the continuous falls of coal. Due to the zealous efforts of the rescuers instead of the work taking a day or more as expected, the men were reached in six hours. They were unhurt and on account of being on a night shift had no knowledge of their peril until they heard the work of the rescue party.

Sunbury—There is considerable agitation among the companies and individuals engaged in dredging coal from the Susquehanna and other rivers of the coal region as to whether they come within the provisions of the anthracite tax act of 1915. It is the opinion of some that the river dredgers are covered by that portion of the act relating to washeries, whose product was not taxed under the old law. There is no doubt that the Attorney General will soon be called upon to render an opinion covering the disputed point.

Gilberton—One thousand employees of the William Penn colliery struck on July 31 because two workmen refused to wear new union buttons and pay up arrears. This compelled the colliery to suspend operations.

Nesquehoning—Two miners, Leo Sparish and John Domita, employed by the Lehigh Coal & Navigation Co., were overcome by black damp in the company's tunnel recently. After prolonged and difficult efforts to induce respiration they were revived and are expected to recover.

Plymouth—The Delaware & Hudson Co. has issued orders that its No. 2 colliery will work double time or two 9-hr. shifts daily. This is done to make up for lost time at No. 5 colliery of the same company. Work was suspended at No. 5 some time ago in order to make alterations to the breaker whereby the coal run through may be washed. Coal from Nos. 4 and 5 mines, also the Boston coal goes through No. 5 when in full operation, but the coal from Boston and No. 14 can be run through No. 2, hence the mines will go on double time. Night shifts in this locality will be a novelty to the miners, particularly at this time when other companies are running slack. The Delaware & Hudson Co. ships a large quantity of its coal to Canada.

Sunbury—Maintaining that the company was negligent in failing to provide sufficient protection against accidents, the Philadelphia & Reading Coal & Iron Co. has been made the defendant in a suit for $30,000 brought by John Colesbody, of Shamokin, who was crushed by a fall of coal in one of the company's collieries.

Hazleton—While boring for water, James Blanchard, an artesian-well driller, struck a bed of fine anthracite on the property of the Mill Creek Coal Co. Geologists had long asserted that coal measures did not exist north of the New Boston mines, but this recent discovery disproves their theory. Arrangements have been made to continue boring tests and it is altogether likely that a new operation will soon be started.

Jeddo—The new steel breaker of the G. B. Markle Co. was recently completed and the machinery given a trial run which was satisfactory in every particular. This work has been completed in a remarkably short time. Coal is now being run regularly through this plant.

Bituminous

Marianna—It is reported that the sale of the Marianna Mines to the Union Trust Co., of Pittsburgh, will be confirmed shortly, and that the mines will be open for operation by Aug. 15. It is said that this operation will be conducted under a company yet to be organized.

Elizabeth—Eight men were killed and 12 injured July 30 at the Patterson Mine of the United Coal Co., at Lovedale. A cable hauling a trip of cars up an incline broke, the cars ran down the hill, left the track at the tipple and fell something like 50 ft. into a gang of railroad laborers at work on a spur track under the tipple. Among those killed was F. P. Dougherty, superintendent of the mine.

Monongahela—Work in all the mines of the Pittsburgh-Westmoreland Coal Co., located in this section will be resumed in full at once. The company has received several large contracts from abroad. The mines affected are the Acme, Hazlekirk No. 1 and No. 2, Dunkirk and Schoenberger. Acme has been running one or two days a week and Hazlekirk men have been getting a day or so occasionally, while Schoenberger has been doing fairly well. Van Voorhis and Dunkirk have been closed tight for more than nine months. When these mines are working full it makes a material change in business conditions here.

Connellsville—Merchant coke operators of the Connellsville region are developing a healthy export business. Since the shipment of coke to Argentine Republic consumers, Italy is getting coke from here. A Uniontown firm also recently sold 44,000 tons of coal to a New York jobber for shipment to Spain.

Boswell—The Somerset County Miners' First Aid Meet, which has heretofore been held at Somerset will be held this year at Boswell on Sept. 4. This will give opportunity to a much larger number of miners to attend the meet.

WEST VIRGINIA

Charleston—It is reported that accidents and fatalities in West Virginia are increasing instead of decreasing. Records of 421 accidents were filed recently during one week, also the occurrence of 11 deaths through accidents; 85 accidents were recently reported in one day alone. This is a higher average than has ever before been known in the state.

A coal company operating in Fayette County recently sent a call to the Pittsburgh distribution branch of the U. S. Immigration Service for 1000 miners. Steady work and good wages are guaranteed. It is said that several thousand miners have been sent into West Virginia from Pittsburgh during the past few months.

The free employment bureau of the State Department of Labor recently had a call for 500 loaders and miners for immediate employment. These men were wanted to operate the Jamison Mines Nos. 7, 8, and 9, near Fairmont. No labor trouble exists at these operations, the need for the men being occasioned by an increase in production.

Fairmont—Two men were recently killed and one severely injured in a gas explosion at the shaft being sunk on Finch's Run by the Federal Coal Co. The men carrying an open light had gone down the shaft to do excavating work. They detected the odor of gas and were attempting to get back when the explosion occurred. The two men killed were Croatians and brothers.

Morgantown—Announcement has been made by the Board of Equalization and Review that the assessments on coal acreage of Monongalia County will be lowered from 5½ to 12 per cent. The percentage of decrease varying with the situation of the coal properties with respect to facilities for operation. This will, roughly estimated, lower the assessed value of coal properties in the county $1,275,000.

Leckieville—Four frame tipples are being built at this plant and endeavors are being made to have the plant in operation by the first of the year with a loading capacity of 4000 tons of coal per day. Work has been begun on 150 modern six and eight-room dwellings for the employees. Granolithic walks will be laid in the town and the streets will be macadamized. A modern school house will be immediately built and also a church. It is the intention to spare no expense in making this operation and town one of the most modern in every respect, including sanitation, amusement and recreation, to be found anywhere in the West Virginia coal fields.

KENTUCKY

Frankfort—A considerable portion of the contents of a new volume issued by the State Geological Survey deals with the coals of western Kentucky, the geological history of which section is traced. The report deals with the coals of the Nortonville, Drakesboro, Dunkor and Little Muddy quadrangles. Speaking of the coals the report says that they are inferior to the coals of eastern Kentucy, West Virginia and Pennsylvania and do not stand shipping as well as the Eastern coals, nor do they have the same clean appearance. They are bituminous, and, compared to the others mentioned, are relatively high in volatile matter, ash and sulphur.

MARYLAND

Cumberland—Four men, Elmer Kallmyer, William McLaughlin, and his two sons, William Jr., and George, were imprisoned behind a fall of roof in the Eckhart No. 3 mine of the Consolidation Coal Co., on the afternoon of July 27. They were rescued at noon the following day by State Mine Inspector William Walters and a rescuing party. The four imprisoned men walked out of the mine unhurt and little the worse for their experience.

OHIO

Steubenville—The mine of the Pluto Coal Co., at Rayland, has been closed indefinitely and the power house boarded up. Almost all of the machinery has been withdrawn from the mine and stored. This closes the plant indefinitely.

Glouster—At a meeting of miners recently held, resolutions were adopted protesting against the rates charged by railroads for hauling Ohio coals. It is declared that discrimination in favor of operators of other states has forced Ohio coal men to close their mines.

Columbus—The New Freight law, passed at the last session of the Ohio General Assembly, which changes the time of filing proposed changes in traffic rates became effective in Ohio July 30. The measure provides for a suspension of a proposed tariff increase when a petition is filed with the Ohio Utilities Commission. A suspension of 30 days may be granted for the purpose of investigating the reasonableness of the proposed increase and if that is not sufficient another 30 days' suspension is allowable. Heretofore carriers have been required to give only 10 days' notice of a freight change and now a 30 days' notice is required.

INDIANA

Evansville—The Big Four Coal Co., with a mine east of the city, has elected not to operate under the terms of the new state compensation law. Notice has been posted to this effect. Most of the mines in the Boonville, Ind., section operate under reciprocal insurance which, it is said, they have found cheap.

The state conference of the coal miners' unions of Indiana will be held here next March and several hundred delegates are expected. The compensation law, which will become effective Sept. 1, is expected to have an effect on the wage scale which will be a matter for discussion. Heretofore the state conferences have been held in Terre Haute.

Boonville—It is stated that the fire which has been burning for more than a year at the Polk Patch coal mines, doing thousands of dollars of damage, has been controlled by confining the area of the fire to 150 acres. This fire was started when a fireman threw a shovelful of hot coal cinders upon an exposed part of the vein.

ILLINOIS

Christopher—Eight men were killed and 15 injured when a part of the east mine of the United Coal Mining Co., near here, was wrecked by an explosion July 27. An explosion of gas occurred in the southeastern entry of Mine No. 1. The dead are John Parks, George Eimacis, Frank Ponaski, Everett Swofford, H. M. Dufour, Alfonso Dufour and Julius Takaseh. About 400 men were in the mine, which is one of the oldest in the state, but only a few were in the vicinity of the explosion. Work had been resumed the day before, after a shut-down of three months. The bodies were taken out by a rescue team that was summoned from Benton. Mine officials think that gas accumulated in an old level causing the explosion.

Gillespie—The new Carlinville Coal Co. has started operations. For the present mules will be used, but in about six weeks it is expected to have electric haulage installed. A new boiler will also be erected, together with 6000 ft. of heavy steel rails. This company intends to make its own electric current with which to operate the haulage, screen, fan, etc.

IOWA

Des Moines—State Mine Inspector Edward Sweeney reports that 4,804,968 tons of coal were mined in Polk County by 2850 men during the year just past as against 2,264,260 tons during the preceding year. Only 4430 men had been employed in mines of Iowa during the year ending July 1, while 4563 men were employed the year before.

COLORADO

Denver—The new workmen's compensation law took effect August 1 and all coal operators are busily engaged making provisions to comply with it. Although employers may elect to not carry indemnity insurance, it is unlikely that any will do so for the reason that such a policy must be publicly announced. This places such employers at serious disadvantage in securing competent laborers while it practically deprives them of all legal defense whenever suit may be instituted for injuries or deaths. Operators are permitted to provide compensation insurance in one of four authorized ways, viz., they may carry policies written by private insurance companies; they may carry their own risks by first satisfying the commission of their responsibility; they may combine with other employers in forming mutual insurance companies for such indemnities; or they may purchase polices from the state's compensation insurance fund. The recent announcement by the commission prohibiting insurance companies from offering any form of rebate, refund or profit-sharing features has considerably disturbed a number of contracts already entered into.

PERSONALS

Thomas J. McNamara has been appointed sales manager of the Pittsburgh & Southwestern Coal Co. with office in Buffalo. The company has a mine at Avella, Penn.

Prof. E. E. Bach, sociological superintendent of the Ellsworth Collieries Co. has been asked to serve as an official judge of the interstate mine rescue contests to be held at the Panama-Pacific Exposition, San Francisco, Calif., from Sept. 23 to 26.

J. B. Henderson, superintendent of the Fort Hill, Paul and Rainey plants of the W. J. Rainey Coal Co., retired on Aug. 1, after 35 years with that concern. Mr. Henderson will be succeeded as superintendent of the three plants by Alvin Mitchell, now superintendent at Acme.

C. F. Mayer, who has been traffic manager of the Sunday Creek Coal Co. for more than 10 years, has resigned, effective Aug. 1. He announces that he will take an extended vacation before taking up other work. The place with the Sunday Creek Coal Co. will not be filled for the time being.

J. F. Bermingham has been elected to the presidency of the Delaware, Lackawanna & Western Coal Co., succeeding E. E. Loomis. Mr. Bermingham's election is one step in the plan to separate absolutely the Delaware, Lackawanna & Western Coal Co. from the Delaware, Lackawanna & Western R.R. Co.

E. J. Wallace, formerly St. Louis manager for the Dealers' Fuel Co., has been appointed district sales manager of the Hoover automatic typewriter, with headquarters at Cleveland, Ohio, and branch offices at Toledo and Youngstown. Mr. Wallace was prominently identified with the coal trade in St. Louis for several years.

Thomas Graham was recently elected chairman of the western branch of the Canadian Mining Institute. Mr. Graham is chief inspector of mines for British Columbia. Among those elected at the same meeting to membership in the branch was Charles Graham, superintendent for the Corbin Coal & Coke Co., operating in the Crowsnest district.

OBITUARY

Robert Lang, 76 years of age, superintendent of the Hill Farm mine near Dunbar, Penn., at the time of the explosion occurring there in 1890, died in the home of his son, in Mt. Pleasant, Penn., July 27. Mr. Lang came from Scotland in 1865 and followed the mines until he was overtaken by his final illness a few weeks ago. For the last 15 years he has been superintendent of a small coal plant of the Lang Coal & Sand Co., in Connellsville; he is survived by three sons and one daughter.

Geo. D. McCreary, financier and coal operator, died of heart disease in Philadelphia on July 26, aged 69 years. He was a director in the Upper Lehigh Coal Co. and the Nescopec Coal Co., and was at one time a member of the wholesale firm of Whitney, McCreary & Kemmerer. He also served five terms as a member of the United States House of Representatives. Twenty-five years ago following the defalcation of an official he revised the financial system of Philadelphia, at the same time turning into the treasury over $70,000 in fees which had accrued to the position in addition to the salary. His action in regard to the fee system was followed by the State Legislature enacting laws eliminating this feature of the administration of city offices. He was also at the time of his death a director in the Market Street National Bank. Despite his varied business activities he was deeply interested at all times in charitable objects and was long noted for his generous philanthropy.

INDUSTRIAL NEWS

Buffalo, N. Y.—The Buffalo & Susquehanna Railway, extending from Buffalo to Wellsville, N. Y., is to be sold at public auction at Buffalo on Aug. 23.

Philadelphia, Penn.—The "Franklin," the first of six steamers being built for the Coastwise Transportation Co., for the purpose of engaging in the coal trade, will be launched in about a week. This boat will be followed by the "Plymouth" in three weeks, with the other four to take the water as rapidly as possible.

London, England—According to an order in council issued Aug. 3, after Aug. 30 British coal cannot be exported except to British possessions and protectorates. The export of coal has heretofore been confined to British possessions, and to countries which are allies of Great Britain. The present ruling eliminates all of these allies.

Buffalo, N. Y.—August G. Gutheim, special examiner of the Interstate Commerce Commission held a hearing in Buffalo on July 27 on the complaint of the Buffalo Union Furnace Co. and the Wickwire Steel Co., made against the Buffalo & Susquehanna Ry. Co., claiming that discrimination has been made against them by the road in favor of the Rogers-Brown Iron Co., in that they are obliged to pay 40c. a ton more for coke brought over the road from the ovens at Tyler and Sykes on the line of the road and 50c. a ton more for carrying pig iron than is charged the Rogers-Brown Co. The amount claimed is $200,000 by the Union Furnace company and $125,000 by the Wickwire company.

Hazleton, Penn.—Eleven years ago when the Lehigh Valley Coal Co. took over the Coxe mining interests in this district the purchase carried with it the Delaware, Susquehanna & Schuylkill R.R. The property was transferred to the Lehigh Valley R.R., which company in a short time practically abandoned it. However, it now develops that the coal tonnage passing through this territory has increased so rapidly that the Lehigh Valley in seeking relief from congested traffic has decided to reopen the old D. S. & S. line and by this means divert the anthracite shipments from the Schuylkill district at Coxton, thus shortening the haul to the Lake ports on shipments that formerly were compelled to pass through this city.

Portland, Me.—Contracts have been let for the construction of a coal pocket on Long Wharf for the Pocahontas Fuel Co. The plant will occupy practically the whole area of the wharf which will be rebuilt. The reconstruction of the wharf has been given to Roy H. Beattie, Inc., of Fall River. The coal pocket will have a capacity of 7000 tons of bituminous coal while 20,000 tons additional can be stored on the wharf proper. The pocket, trestles, elevated railroad and office will be built by J. W. Gulliver of Portland. The hoisting machinery will be furnished by the Lidgerwood Machine Co., of New York City, and the cable-car machinery by the Exeter Machine Works, of Pittston, Penn. The plant will be capable of unloading coal from vessels at the rate of 400 tons per hour.

Denver, Colo.—The American Coal Refining Co. is erecting a plant at 7th and Wewatta St., Denver, to handle 500 tons of lignite slack per day and to derive therefrom numerous products. Charles O. Hoover, vice-president and chemist, is commercializing certain processes of his own devising whereby he expects to extract from the lignite a binding liquid to be used in briquetting the same coal. The plant is planned to also manufacture a fluid resembling gasoline, usable as a motor fuel, that will be placed on the market under the name of "coaline." Commercial gas is another product. C. V. Fisher, of Kansas City, Mo., is president; Schuyler C. Peck, of Denver, is secretary and W. J. Stevenson, of Kansas City, is treasurer. The main office is at 406 First National Bank Building, Denver.

Cincinnati, Ohio—The United States Circuit Court of Appeals has handed down its opinion passing upon a motion filed on behalf of the Hocking Valley and Chesapeake & Ohio railway companies, requesting the approval of a scheme devised by those companies for the sale of their coal properties in compliance with the decree of the court handed down in March. The decision tentatively approves the plan suggested, which contemplates the organization of new companies to operate the coal properties whose purchase price will be largely taken care of by securities to be issued and turned over to the railroads. October 9 has, however, been fixed by the court as a date upon which the Government may submit any objections it may have to any of the details of the plan. The court entered an order dismissing petitions filed recently by John S. Jones against the companies, alleging failure to comply with a contract involving the disposition of the properties at issue, as the decision covers the entire question of the proposed sale.

Denver, Colo.—The Denver & Rio Grande and the Cripple Creek district railways recently announced an increase in freight rates, to become effective July 26, on coal from the Cañon City field to Cripple Creek points. The increase proposed was 50c. per ton, making the freight $3. However, the state public utilities commission suspended this increase and it cannot become effective until the commission decides that it is justifiable which is improbable in view of recent refusals of the commission to accede to similar requests to increase rates on coal from the South Cañon and the Palisades districts in western Colorado to Denver and points east. The commission refused hearings in numerous other applications, but, because of peculiar features in these particular instances, hearings were granted. It appears that the Colorado & Midland R.R., through its general agent, opposed the increase requested by the competing road—the Denver & Rio Grande R.R.—and evidenced its readiness to haul coal from the western slope points at rates even slightly lower than those proposed by the commission, by reason of its shorter mileage. It was this point that decided the commissioners who believe that the complaining roads can still compete at a profit.

Philadelphia, Penn.—Judge J. Whitaker Thompson, in the United States District Court, has sustained the validity of three indictments against the Philadelphia & Reading Ry. Co. in which it is charged with having transported coal to New England ports via a barge line owned by the company and for which it had not posted rates of freight, in violation of the inter-state commerce law. This decision is considered of great moment, as it indicates for the first time, it is claimed, the powers of a Federal Grand Jury. The indictments were first returned last December, when the Grand Jury subpoenaed officials of the railway to appear before it with their books, without any charges having been preferred against the company. The hearing was held in secret and following the information then elicited the indictments were returned. The company on an appeal succeeded in having these indictments quashed, its contention being that two stenographers had been present in the jury room in violation of the law. However, the Grand Jury at the March term reindicted the company, and the hearing just held was based on the indictments of the March jury. It is stated that the Government has brought the suit in order to obtain equal rates for independent shippers of coal via water to coast points, particularly the New England States. At the trial, the date of which has not as yet been fixed, the Government attorneys will endeavor to prove that the barge or towing lines come within the jurisdiction of the inter-state commerce commission and that the tariffs should, therefore, be filed for the inspection of all interested, as they allege the rates at the present time are secret and discriminatory as applied to other than socalled favored mining companies.

St. Louis, Mo.—The Missouri & Illinois Coal Co. filed suit in the St. Louis Circuit Court, July 28, against the Willis Coal & Mining Co. for $85,965.80 alleged to be due the Missouri & Illinois company under alleged verbal contracts. The petition recites that both companies own mines at Willisville, Ill., on the Mobile & Ohio R.R., and that in November, 1903, a verbal agreement was entered into for the Willis company to supply two-thirds of the railroad company's needs and the Missouri & Illinois company the other third. The Willis company was to contract in its own name and collect from the railroad company the price agreed upon and pay over to the Missouri & Illinois company for the coal delivered by it, the exact price paid by the railroad company to the Willis company. It is alleged that the verbal agreement was renewed from time to time and coal was furnished by the Missouri & Illinois company to the railroad company, under different contracts at prices ranging from 94½c. a ton to $1.12 a ton between Apr. 1, 1904, and Oct. 30, 1914. The petition states that the Missouri & Illinois company did not become aware until Jan. 1, 1915, that the Willis company had not paid over to it all the money received from the railroad company for coal furnished by the Missouri & Illinois company. The claim of this firm is that it received $85,965.80 less than it was entitled to under the verbal contracts. In a previous suit, decided adversely to the Missouri & Illinois company, it sought an accounting. The Willis company contends that it did not agree to give the Missouri & Illinois company the price obtained from the railroad company. The Missouri & Illinois company has also filed in the United States District Court a suit against the Willis company and the Mobile & Ohio R.R. Co., under the Sherman anti-trust act, asking $450,000 damages on the ground of alleged conspiracy to monopolize a part of the coal trade.

Coal Trade Reviews

General Review

Anthracite continues heavy though operations are increased. The boom in steel and the new restriction on British exports are the predominating features in the bituminous situation. Less favorable crop outlook a depressing factor.

In spite of the fact that the anthracite demand has disappeared almost completely and the storage depots are generally choked with coal, some of the larger hard coalers have been able to increase their operations to practically full capacity for the time being, at least. An almost unprecedented dullness prevails in all branches of the trade, but this lack of buying will cause a tremendous rush when the fall trade opens up, and it is probable that operations are already being tuned up in anticipation of this. In the meantime the individuals are slashing the prices down to the full April circulars, and even occasionally offer still further inducements.

The tremendous boom in iron and steel has had a mildly stimulating effect upon the bituminous market, although not of sufficient proportions to relieve the pressure. Manufacturing plants have been pressed to accept so much coal throughout the season that they are not able to absorb much more. The most encouraging aspect of the current situation is the belief that it certainly cannot become much worse. Prices are standing up well considering the stress, but occasional demurrage consignments force out some extremely low quotations.

The export trade continues the leader. Practically all the Atlantic coast piers continue breaking previous high records month after month in an unprecedented manner, but even the gross tonnage involved is so small as compared with the production of the country, that it is hopeless to anticipate any general relief in this direction. The new British order prohibiting exports to their allies promises to throw a heavy extra demand on this country.

With the steel mills in the Pittsburgh district taking their maximum quota of coal, there is a better sentiment prevailing in the trade though this has not been reflected in prices as yet. Coal on track seems to be fairly well cleaned up, and with the heavy export movement from this district, the market should be fairly well sustained if operators do not crowd production too fast.

The only feature of interest in the Ohio market has been the inception of a state wide movement to promote the sale of the local product in preference to the West Virginia and Pennsylvania grades. The situation in the Ohio industry has become so acute as to elicit general concern on the part of the public and concerted action is being taken to relieve the distress developing in the mining regions. In the meantime the situation continues as discouraging as ever. Demurrage coal is forcing ruinously low prices while manufacturers are confining their purchases entirely to the spot market. Prices are generally so uncertain that the market is difficult to quote.

Uncertainties over the crop outlook in the Middle West, together with indications that production has been speeded up ahead of the absorptive power of the market has caused a general hesitancy throughout that section. Some demand for stocking purposes is appearing, but this business is much behind normal, and indications point to a congestion this fall. Confidence is still expressed over the future outlook, but it is noted that the agencies are displaying less assurance than formerly.

A Year Ago—Anthracite operations heavily restricted. European war disrupts routine business on the Atlantic seaboard. Market technically strong but subject to many disturbing influences. Middle Western situation improving.

BUSINESS OPINIONS

Boston News Bureau—One is obliged to diagnose the situation differently than in normal times. Somehow we seem to be in a period when it is unsafe to predict anything. Operating forces are largely in the nature of surprises. The minds of practically everybody are fastened on the European map. This country is deriving enormous advantage from the necessities of Europe. Money remains abundant and credit everywhere is free.

Iron Age—Pig iron, after being in a rut for months, while steel has been active at advancing prices, has started in the past week on what promises to be an important movement. Prices in all districts are up 25c. to 50c., and the sudden appearance of inquiry from many sources indicates an effort of consumers to forestall a long delayed rise. The country's July pig iron production was 2,563,420 tons, against 2,380,827 tons in June. The steel companies are now close to their maximum pig iron capacity. In only four previous months—January, February, April, and May, 1913—was the production of steel works furnaces greater than last month's. In steel products the week has been quieter. Most domestic consumers are apparently covered for several months and there is little or no protective buying.

Am. Wool and Cotton Reporter—Good wools are becoming rather scarce. Domestic wools are now more in demand than the foreign wools. There is more call for territorial wools than for fleeces or scoured wools. Further indication of increased activity in the goods market is reflected. In the woolen and worsted goods market the main feature in the situation is the satisfactory trade in staples.

Dun's—Important strides toward commercial and financial supremacy have been made by the United States during the year of war that has caused incalculable losses in Europe. Though there are still some drawbacks, such as the abnormal shipping situation, American enterprise is steadily reaching out to new goals, and confidence in the future is expressed on every hand. Bountiful grain crops seem assured, and these will be sold at remunerative prices.

Dry Goods Economist—Although no marked improvement has been noticeable during the week in business generally, the underlying conditions are stronger than they have been for some time and there is a quiet feeling that from now on business will steadily increase in volume. This feeling is all the more intensified by the fact that various local strikes, which at first looked very serious, have now been amicably settled.

Bradstreet's—Activity in iron and steel, continued improvement in industrial operations, diminished idleness, a quieter labor situation, a steady flow of orders for munitions of war, ease in money, some improvement in collections, fine crop news, and growth in optimism as to excellent business this fall, stand out in marked contrast to reports of midsummer quiet in trade circles and of slackness in industries not depending upon war orders.

Marshall Field & Co. — Weather conditions have been a serious handicap to dry goods distribution during the week, and wholesale shipments show a decrease as compared with those of the same week a year ago. Retailers, however, have visited the market in larger numbers than during the corresponding week last year. Collections are normal.

Southern Lumberman — While the volume of hardwood business done in July was little if any in excess of that of either of the two preceding months, the end of the month finds the market steadier and in somewhat better condition in numerous ways.

Armour & Co. — General trade continues to improve; increased activity in all industrial lines manifests itself. The Steel industry is on a sound footing; large number of men being employed, and the number being steadily increased; eastern plants working at maximum capacity and, in many cases, unable to meet demand; prices rising and firm.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River market druggy but no significant change in f.o.b. quotations. Occasional market cargoes serve to keep delivered prices down to minimum. Georges Creek plentiful and Pennsylvania grades continue very dull. Anthracite orders few and far between.

Bituminous—There is no significant change in prices f.o.b. Hampton Roads, although with all grades of Pocahontas and

New River trade is very light. Receipts on contract are relatively small and there are practically no current sales. Exports are still the mainstay of the market and while coal with individual shippers may be temporarily in short supply it is because output has been held down closer to the demand than was the case earlier in the season.

Occasional market cargoes have appeared the last week or so and some extremely low prices on cars are the result. While there is the chance of this as a factor in the trade there is little hope of improvement for a long time to come. Plants have been so pressed to accept deliveries the whole season through that they will make room very slowly. The textile mills usually make August a light month.

Georges Creek is coming forward freely on contracts and ample supplies are now available. The amount of foreign tonnage reporting for loading at Baltimore has sagged off materially, although this is regarded as only temporary. The shippers of the Pennsylvania grades are nearly all pressed with coal standing at the piers. Shipping orders are hard to get, even on good-sized contracts, and there will have to be a material curtailment to avoid lower prices. Several options for comprehensive tonnages to foreign buyers have not been exercised and the prospect is for dull business at least until September.

Water Freights—There is still an abundance of barge and steamer tonnage for what little business is offering. Rates, however, show no pariticular weakening. Sailing vessels are practically out of the market except for small coasters out of New York and Philadelphia. Freights offshore are still attractive enough to draw from the coastwise trade almost every sailing vessel over 700 to 800 tons; 75c. to Boston, 3000 tons upwards, is about the current quotation from Hampton Roads.

Anthracite—Trade is still very quiet. Some large discounts on egg and chestnut have been made by individual shippers; on chestnut as much as 50c. less than the company price has been reported in several instances. Orders are scarce but not unusually so for the time of year.

Prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.15@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.40@2.85	2.92@3.02	
New York*	2.40@2.95	2.70@3.15	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.65@2.80
Boston†	.....	.....	.....	3.50@3.63
Providence†	.....	.....	.....	3.45@3.68

* F.o.b. †On cars.

PHILADELPHIA

Anthracite shows slight improvement but is still extremely dull. Stove and egg in best demand, with chestnut the heaviest. Pea slightly stronger. Collections exceptionally bad. Midsummer quietness prevails in the bituminous trade. Steel boom being felt.

Anthracite—The slightly improved condition of the market as noted last week has continued but is only noticeable in the business of the large companies which advance prices on the prepared sizes each month. These companies produce the well known and standard grades that are always in demand and the dealers have placed quite a few orders this week to save the 10c. advance on Aug. 1. As a result of this improvement the Lehigh Valley, Reading and Lehigh Coal & Navigation collieries are working six days a week.

The individual shippers are offering any quantity of the prepared sizes at the April prices, and in a few instances where the order was made to carry chestnut even those figures were slightly shaded, probably by absorbing the tax. Chestnut size continues to give great concern as to its disposition.

Stove coal is the most active and is even occasionally scarce. Egg is also fairly active, but there were plenty of individual offerings of this size well off the current circular. Pea coal is still low in price, although the extremely low prices that have been prevalent were not so much in evidence this week, quotations ranging from $1.75 up to not more than $2 on the better grades. As indicative of the dealers' attitude toward the price on pea, one of the retail companies which was awarded a good portion of the school contract offered an individual operator $1.35 for 5000 tons of pea.

The poor collections continue and those most concerned with this end of the trade seem more worried about this feature of the market than any other. This applies to the wholesaler as well as the retailer. No retail dealer seems to have collected anything like a fair proportion on his spring deliveries and he in turn is naturally deeply indebted to the shipper. The opinion is that it will take some drastic movement like a strike or a long suspension to straighten out the market and stiffen prices.

With the worst month gone August can be looked forward to produce at least a slightly better tonnage. There are quite a few dealers who have not laid in any stock yet and who always linger along until this time so as to extend the time of payment of bills into the fall, until they can make some sales and thus do business practically on the shippers' capital.

Following their usual custom the large operators have issued their August price circular this week, increasing the prices on the prepared sizes 10c. per ton as shown below, to which should be added the Pennsylvania State tax of 2½c.:

	Line	Tide		Line	Tide
Broken	$3.40	$4.55	Pea	$2.50	$3.25
Egg	3.65	4.80	Buckwheat	1.25	2.25
Stove	3.90	4.80	Rice	.85	1.75
Chestnut	4.05	5.05	Barley	.50	1.50

Bituminous—While the bituminous trade has been exceptionally dull for a long period, the feeling is that it cannot be any worse with the passing of July which is usually the dullest month of all. The last week showed an improvement due to the boom in the iron and steel trade, particularly those plants that have been waiting for the completion of additional buildings. The betterment has not been reflected in any increase in prices as yet. The tide shipments are good; in fact the July tonnage has broken records, being almost three times that for the same period last year, with prospects for an even better trade when additional ships are available. The prevailing prices are as follows:

Georges Creek Big Vein	$1.65@1.75	Fairmont gas, mine-run	$1.15@1.25
South Fork Miller Vein	1.50@1.60	Fairmont gas, slack	.65@ .75
Clearfield (ordinary)	1.00@1.20	Fairmont lump, ordinary	.85@ .95
Somerset (ordinary)	1.00@1.15	Fairmont mine-run	.75@ .80
West Va. Freeport	.85@ .95	Fairmont slack	.45@ .55

NEW YORK

Bituminous situation slightly improved. Spot demand better. Gas coal for South America. Export demand good. Anthracite market dull. Individual coals at concessions.

Bituminous—Some dealers say there has been a slight improvement in the bituminous situation, but the majority believe the market shows no change. The demand seems slightly stronger and the prospects for a heavy fall business are good. Spot coal is still plentiful but there are not as many loaded bottoms as a week ago. Many contract holders are in the market for bargains and other large consumers who refused to sign up last spring are buying from hand to mouth, believing they will be able to get a sufficient supply as needed.

The mines as a rule are working on about a four-day-a-week schedule, although those producing the higher grades are doing better. By September dealers look for higher prices and a scurrying among large consumers with no contracts. Contract coals continue to move readily.

In the local harbor sufficient coal remains to supply all immediate wants. Occasionally it has been possible to pick up good bargains. Western Maryland has been quoted at from $2.30 to $2.35.

The export situation remains strong. Some contracts are about completed for shipments of gas coal to South America and it is reported that at least one New York house has about closed a contract with the Russian Government for a good sized block of coal. A detriment to the development of the foreign trade at present is the high freight rates.

Current quotations are on the following basis:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.30@3.40	$3.30@3.40	$3.30@3.40	$1.75@1.85
Georges Creek Tyson	2.90@3.00	2.90@3.00	2.90@3.00	1.35@1.45
Clearfield:				
Medium	2.65@2.80	2.55@2.65	.....	1.10@1.25
Ordinary	2.55@2.60	2.55@2.60	.....	1.00@1.10
Broad Top Mountain				1.10@1.45
Cambria County:				
South Forks	2.90@3.05	.....	.....	1.35@1.50
Nanty Glo	2.75@2.80	.....	.....	1.20@1.25
Barnesboro	2.65@2.70	.....	.....	1.10@1.15
Somerset County:				
Quemahoning	.....	2.70@2.85	2.70@2.85	1.20@1.30
Medium	2.65@2.70	2.60@2.65	2.60@2.65	1.10@1.15
Latrobe	2.45@2.55	.....	.....	.90@1.00
Greensburg	2.75@2.80	.....	.....	1.10@1.15
Westmoreland	3.15@3.20	.....	.....	1.35@1.45
West Virginia Fairmont		2.60@2.70	2.60@2.70	.85@ .90
Fairmont mine-run	.....	2.50@2.60	2.50@2.60	.70@ .80
Steam	.....	2.45@2.50	2.45@2.50	.90@ .95
Western Maryland	.....	2.35@2.40	2.35@2.40	.80@ .85

Anthracite—Demand for prepared coals at Tidewater seems to have nearly disappeared and in the line trade all yards are reported filled. The expected rush the last week of July did not materialize and the new month has started out very quietly.

Independent coals continue to flood the market and have resulted in big concessions to bargain hunters. Quotations on individual coals have remained practically the same for two months and the opening of the new month sees no change. Everybody looks for a busy fall and winter. Retailers say

they have enough orders on their books to keep them busy during September but that they cannot deliver any of the coal until ordered.

Of the prepared sizes stove is the strongest and nut the weakest. Pea is long and some good bargains have been reported. The buckwheat coals do not seem to be so plentiful but there has been no improvement in prices.

Current quotations follow:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$4.95		$5.00	
Egg	5.20	$4.70@5.20	5.25	$4.75@5.25
Stove	5.20	4.70@5.20	5.25	4.75@5.25
Chestnut	5.45	5.00@5.45	5.45	5.05@5.50
Pea	3.50	2.70@3.00	3.55	2.75@3.05
Buckwheat	2.75	2.00@2.25	2.80	2.05@2.30
Rice	2.25	1.70@1.85	2.30	1.75@1.90
Barley	1.75	1.45@1.70	1.80	1.50@1.75

BALTIMORE

Coal Men more optimistic as tonnage movement and demand improve. Exports keep up and prospects for record-breaking period are bright.

From the mining sections of western Maryland, West Virginia and Pennsylvania come reports of increasing activity at producing points; that the movement for August will greatly exceed that of July is generally conceded. Many big plants are now working day and night on war orders of various kinds, and this is being felt along other lines of activity. Money is growing a little easier, and there are some who now believe the demand may be such as to tax the capacity of the mines before long.

While better grade coals are being held more closely the poor to ordinary fuels are still offered at very low figures. Lower-grade steam coals of Maryland and West Virginia are going at 75 to 85c., and run-of-mine gas is easy at 80 to 85c. Ordinary Pennsylvania grades are offering at 90 to 95c.

During the past week the coal-export movement took another jump. With a total of 65,484 tons of cargo coal exported for the last six working days of the month, the official total when issued will probably show between 232,000 and 235,000 tons loaded here for foreign ports for the month. With many charters announced or pending for August and September many persons are looking for a record-breaking coal movement on foreign account during those months.

Anthracite men are making spasmodic deliveries on early summer orders, but the whole of that field is extremely quiet. All sizes are in easy supply. A word of warning is being sounded quietly by some of the coal men regarding the possibility of strike troubles with the end of the agreements in the spring.

Tide prices on anthracite f.o.b. vessel, Baltimore, Md., are as follows:

Broken	$5.10	Nut	$5.60
Egg	5.35	Pea	3.85
Stove	5.35	Buckwheat	2.60

HAMPTON ROADS

Heavy export shipments continue. Italy still taking large quantities. Prices stationary. July dumpings reach million and a half tons.

The week's coal shipments from Hampton Roads ports have been heavy and a large percentage of the movement has been to foreign markets. Italy is still receiving a large portion of the export coal from this port. The largest single cargo of the week went to Cristobal, Canal Zone, being loaded into the collier "Achilles" and amounted to 12,000 tons. The cargo to Rotterdam was large, amounting to 8000 tons, and is particularly interesting from the fact that very little coal is shipped from Hampton Roads to Dutch ports.

There is little free coal at Tidewater at this time; practically all of the shippers are pushed for coal to take care of vessels in port and about due. Prices remain stationary and it is not believed that even with the heavy demand that there will be any increase.

The dumpings for the month of July will be around a million and a half tons; on the morning of July 31 the Norfolk & Western at Lambert Point had gone over 800,000 tons, the Chesapeake & Ohio Ry. at Newport News over 429,000, and the Virginian Ry. at Sewalls Point about 300,000 tons. This will therefore make the month of July break all previous records at Hampton Roads and prospects are even now bright for August to exceed the July movement.

Railroad Tonnages—Dumpings over the local piers for the past several weeks compare as follows:

Railroad	Week Ending July 3	July 10	July 17	July 24	July 31
Norfolk & Western	211,017	174,822	180,090	197,913	188,593
Chesapeake & Ohio	83,678	76,397	116,862	96,627	84,018
Virginian	58,455	57,467	78,710	86,523	39,335
Totals	291,828	308,686	375,662	381,063	311,946

OCEAN FREIGHTS

A number of large British steamers were offering last week at $8.28 for coals to Lower Plate ports, at which rate a few of these steamers were chartered, but neutral tonnage is difficult to obtain for this voyage even at $8.40. Mediterranean freights are firmer, owing to the competition of grain, which is now actively in the market, and rates to Cuban and West Indian ports are also firmer, on account of the limited supply of tonnage available for these trades.

To	Rate	To	Rate
Havana	$2.25@2.75	Bermuda	$3.00
Cardenas or Sagua	3.00@3.50	Vera Cruz	3.25@3.75
Cienfuegos	3.00@3.25	Tampico	3.25@3.75
Port au Spain, Trinidad	3.50	Rio	8.40@8.64
St. Lucia	3.25@3.50	Santos*	8.40@8.88
St. Thomas	3.00	Montevideo	8.22
Barbados	3.50	Buenos Aires or La Plata†	8.28
Kingston	2.75@3.00	Rosario	8.64@8.88
Curacao	3.25	West Coast of Italy	9.12@9.60
Santiago	2.75@3.25	Barcelona**	8.40@8.88
Guantanamo	2.75@3.25	Valparaiso or Callao	6.25@6.50
Demerara	4.25@4.50	Marseilles	8.64@9.12

Note—Rates noted in **bold face** type are only approximate.
* Consignees paying dockage dues. ** Spanish dues for account. † Quotations on Plate coal by British tonnage. Rate on neutral tonnage to Montevideo, Buenos Aires or La Plata about $8.40. Neutral owners prefer Buenos Aires.
W. W. Battie & Co.'s Coal Trade Freight Report.

Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge. 24c. per net register ton per day demurrage."

VESSEL CLEARANCES

The following steamers have cleared from Hampton Roads July 24 to 31, 1915:

NORFOLK

Vessel	Destination	Tons
Marosa	Rio de Janeiro	2167
Walden Abbey	Rio de Janeiro	2868
Peitro	Leghorn	5155
Wellington	Genoa	8231
Romford	Port Castries	4500
Denwell	Buenos Aires	4400
Brendon	Dakar	6800
Colomba	Porto Ferrajo	4700
Marcus L. Urann	Rio de Janeiro	5000
Achilles	Cristobal	12,000
Rothley	Montevideo	5604
Antiope	Buenos Aires	4077
Clarissa Radcliffe	Genoa	8687
Wm. C. May	St. Michaels	1088
Aboukir	Antofagasta	5900
Wegadesk	Cristobal	6500

NORFOLK

Vessel	Destination	Tons
Kiki Issaia	Colamata or Syra	4404
Antonios Mavrogordatus	Genoa	5453
Chincha	Iquique	1695
Andreas Grakis	Spezia	4319

NEWPORT NEWS

Vessel	Destination	Tons
Lucy Neff	Santiago de Cuba	1050
Lindenhall	Spezia	6100
Ilva	Porto Ferrajo	2600
Petritsis	Maddalena	5434
Soestdijk	Rotterdam	8000
Antonietta Accame	Spezia	3822

OCEAN CHARTERS

The following charters have been reported from various sources during the past week:

PHILADELPHIA

Vessel	To	Tons	Rate
R. P. Murphy	Mayaguez	572	$2.85
Millicent Knight	Mediterranean	2302	
Sif	Martinique	1959	
Alice M. Colburn	Porto Rico	2400	
Dionyssias Stathtas	Barcelona	2296	
William Booth	Calais, Me.	825	1.32
Horace A. Stone	Porto Rico	1237	

BALTIMORE

Vessel	To	Tons	Rate
Framlington, Ct.	River Plate	2592	
Argo	River Plate	1970	
Mar Caspio	Barcelona	1632	
Kaupanger	Malmo	2104	
Grekland	Stockholm	1671	
New Sweden	Sunsvale	3287	
Hogland	Stockholm	2582	
Artemis	Gothenburg	3062	
Salamis[1]	Italy	2307	$8.64
Jersey City[1]	Italy	2955	9.48
Cloutsham	River Plate		
Riverdale	Guayaquil	2752	
Nogo	Montevideo	3953	
Exford	France	7239	
Framling, Ct.	Argentina	5800	
Ubbergen	Costa Rica	3000	

BALTIMORE—(Continued)

Vessel	To	Tons	Rate
Claveresk	Cuba	6100	
Grekeana	Sweden	5000	
Carolyn	Galveston	1414	
Nea Hellas	Piraeus[2]	2267	9.36
Calimeris	Italy	2224	8.64

[1] Or Virginia [2] Or Syra

VIRGINIA (Including Hampton R'ds)

Vessel	To	Tons	Rate
Deddington	Campana[1]	1806	$8.28[2]
Alcana	La Plata	2246	8.28
Rothley	Buenos Aires	2487	8.28
	Daker	2804	8.64
Salamis[3]	Italy	2307	8.64
Republic	Pernambuco	680	7.75
Vasilefs Georgios	River Plate	2382	8.16
Jersey City[3]	Italy	2955	9.48
Nailsea, Ct.	Buenos Aires	2152	8.28
Ribe	Rio Grande	1405	10.08
Brendon	Daker		
Wegadesk	Colon	2388	
Ludgate	Campana[1]	2390	8.25

[1] Or Villa Constitucion [2] Option Rosario $8.52 [3] Or Baltimore

ATLANTIC RANGE

R. B. White	Charlottetown	411	

Note—Steamers are indicated by **Bold face type**, all others being schooners.

LAKE MARKETS

PITTSBURGH

Conditions not materially improved but sentiment much better. Export demand for Connellsville coal improved. Operations at 50 to 55% of capacity.

On the whole, there is no improvement in the coal situation in the Pittsburgh district, but there has been a decided

improvement in sentiment, and much stronger hopes are expressed that there will be a marked improvement before the Lake shipping season closes. The steel industry is now taking very nearly its maximum quota of coal, as the mills in the Pittsburgh district are operating very nearly at capacity, though their tonnage output and consumption of coal are not as large as they would be in cooler weather with the same equipment nominally in operation.

Shipments in the Lake trade continue light, and the sharp increase that was expected for August is as yet showing little signs of materializing. Export demand continues to increase, and the Connellsville district operators are shipping larger tonnages than ever. Five of the largest mines of the Monongahela-Pittsburgh-Westmoreland Coal Co. were ordered on full time to fill exceptionally large export orders. Slack maintains the firmer level recently quoted, production being light for this time of year and demand fairly adequate.

Prices for free coal are not quotably changed and stand as follows: Slack, 50@55c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district. On contract to Apr. 1 prices are a shade firmer than for free coal, mine-run being available at $1.05@1.15. Pittsburgh district operations remain at an average of 50 to 55% of capacity.

BUFFALO

Bituminous still improving and slack about normal. Outlook for a good fall trade ahead. Anthracite not moving yet, but expected to early in fall.

Bituminous—A better volume of trade is reported, with good prospects of plenty to do by fall. The best feature is a larger demand for slack, which has advanced to a profitable level. If the Lake trade should become active the situation would be fairly good, so far as the volume of business is concerned, though it is not likely that the prices will advance. Some jobbers who have often been buried in coal that they could not sell at any price are now reporting that they have not a single car on track and that there seems likely to be demand for all they get from this time on if the mines do not crowd the production too much.

The improvement naturally follows the stir in iron and this promises to continue. The Lackawanna Steel Co. reports that it has orders three months ahead and other concerns are also quite active. While there is no real advance in prices the market is much firmer, and there is no further report of badly cut prices to move stranded shipments. Quotations are steady on the basis of $2.70 for best Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.25 for slack.

Anthracite—The trade has not improved. There was some expectation of the usual small spurt at the end of the month, but the increased demand was not large. It is the idea of certain shippers that the spurt at the end of August will be quite large and that the demand will then continue through the fall, and culminate in a big rush by early winter. Shipments by Lake are much smaller than a year ago, on account of the filling up of the Upper-Lake docks. The amount loaded for the week was 102,600 tons and for July,449,012 tons, as against 810,410 tons in July last season and 1,869,390 tons for the season, as against 2,219,735 tons to August last season.

TORONTO, CAN.

Plentiful supplies and market continues dull.

Trade continues very dull, buyers as a rule only ordering for immediate requirements. There are full supplies on hand in all lines and but little coal coming forward, as nearly all the yards are stocked up to full capacity. There has been no change in prices, which are likely to continue as at present until September, when the usual advance in anthracite is anticipated. Quotations for best grades are as follows: Retail, anthracite egg, stove, and nut, $7.50; grate, $7.25; pea, $6. Bituminous, steam, $5.25; screenings, $4.25 to $4.50; domestic lump, $6; cannel, $8. Wholesale f.o.b. cars three-quarter lump, $3.56; screenings, $2.90.

TOLEDO

Lake movement light at Toledo.. Market fails to show any improvement otherwise. West Virginia grades in best demand. An acute situation developing as regards the Ohio industry.

The trade is showing a moderate improvement and prices are holding fairly close to list. The Lake trade has not shown much increase and steam coal is not particularly firm. Domestic grades are better and are expected to improve from now on. Pocahontas continues very firm although there seems to be a trifle better supply. Anthracite is selling off the list here which is most unusual. Steam coal of all kinds is slow and prices are weak. The threshing season is late owing to wet weather and this has delayed the demand from this source. Stocking will begin within a short time now which will give some impetus to the trade. Contracts are not being made very freely, many concerns which usually have their contracts all closed up by this time now buying bargain coal off the tracks.

Ohio operators declare that it is impossible to compete with West Virginia under present operating and traffic conditions. Ohio miners are actually suffering from lack of work and following the Governor's call for financial assistance for the miners and their families a "Buy Ohio Coal" campaign was started at Athens and is gradually spreading over the state. It is hoped this will improve matters somewhat but Ohio operators feel that the lawmakers and public opinion must straighten out the tangle if Ohio mines are again to be operated.

COLUMBUS

Slight improvement in the domestic trade. Steam business is still slow. Production at a low ebb.

There has been a fairly steady demand for domestic sizes for stocking purposes, but the volume of business is hardly equal to that of former seasons. The tone of the market is not very good and the trade is playing a waiting game.

Stocking of Pocahontas and West Virginia grades is the best feature at the moment. There is a fairly good demand for Pocahontas, due to the increase of 25c. per ton on Aug. 1. White ash and other West Virginia grades are also moving fairly well. It is still too early for any extensive movement of Hocking, although some is being purchased by dealers. On the whole, the stocks in the hands of dealers are not as large as usual at this time of the year. Retail trade is fairly brisk, especially to householders. There appears to be a better demand for anthracite than ever before.

Steam trade is still dull and there is no immediate hope for improvement. Manufacturing plants are only buying from hand to mouth and are apparently loath to accumulate stocks; much of this buying is in the open market. But few contracts are expiring and the work of renewing is difficult. Railroads are using only a fair amount of fuel.

Lake trade is still dull in every particular. Reports from the Northwest show that there is a considerable tonnage on the docks of the Upper Lake ports and the movement to the interior is slow. The Sunday Creek Coal Co. has not started Lake shipments and may not ship any Lake coal at all this season.

Prices are being fairly well maintained in the retail field despite the depression. Dealers are not inclined to sacrifice profits for business. Some cutting is reported but not sufficient to demoralize trade in the least.

Prices in Ohio fields are as follows:

	Hocking	Pomeroy	Kanawha	Eastern Ohio
Rescreened lump	$1.50	$1.55		
Inch and a quarter	1.35	1.35	$1.30	$1.25
Three-quarter inch	1.25	1.25	1.25	....
Nut	1.15	1.25	1.15	....
Mine-run	1.05	1.10	1.05	1.00
Nut, pea and slack	65	.70	.65	.60
Coarse slack	55	.60	.55	.50

Mines have been working at about the following percentages of full capacity.

District	Week Ended July 10	July 17	July 24	July 31	District	Week Ended July 10	July 17	July 24	July 31
Hocking	20	25	25	15	Cambridge	25	35	25	30
Jackson	15	25	20	20	Masillon	25	30	25	25
Pomeroy	45	40	40	35	Eastern O.	60	50	55	50
Crooksville	30	20	20	20					
					Average	31	32	30	29

CLEVELAND

Eastern Ohio slack and other Ohio fine coals are selling at $1.55 to $1.65, largely because of the contracts closed the last few days. Pennsylvania grades are not quite so strong.

In the last few days a number of Ohio furnaces have closed for their requirements at 75c. for No. 8 slack at the mines. The National Tube Co. at Lorain, Phillips Sheet & Tin Plate Co. at Canton, La Belle and Cambria at Stuebenville and Mingo Junction, Carnegie Steel Co. and others have contracted. Excepting the Lorain contract the freight rate is 25c. a ton.

This has taken all the No. 8 slack that is being produced and to give any one else coal the operators must spread it over their trade on a proportionate basis as the steel companies could use more than they are getting. As a result of these contracts No. 8, Middle district and Goshen fine coals are worth $1.55 to $1.60 at Cleveland. Fairmont is on about the same basis while Pan Handle is worth only $1.50 and Youghiogheny, $1.60.

The coarse coal market is unchanged and the market for Lake coal is very quiet. Lake coal shipments are at the low point of the last month with no improvement in sight for at least another month. Pocahontas lump and egg are firmly held at $3.70 delivered at Cleveland, with mine-run at $2.70, though not particularly firm.

CINCINNATI

A shorter car supply and the advancing season furnish some ground for hope of a better market, but demand continues extremely dull. Price concessions are common.

There has been some demurrage coal on the local market during the past week, which is rather unusual at this season. There are some hopes that the beginning of the end of the unprecedented slump is at hand, as the first of August should certainly bring some buying while reports of car shortage at several points indicate that there may be some trouble in taking care of a normal movement later on.

With prices completely demoralized, however, it is difficult to quote the market. Some of the larger retail concerns are putting in their usual supplies at their regular prices, but the smaller retailers, especially out in the state, have shattered considerably from bad credits, and are not anxious to buy any more coal than they have to. The steam market, on account of the dullness in manufacturing circles, is not much, if any better off.

LOUISVILLE

Slight improvement in domestic coals but the general market continues heavy.

Some welcome improvement in the Kentucky coal market has been noted chiefly in the domestic line. The domestic demand has been late in developing and has not reached anything like the normal volume. As yet prices have shown no stiffening. Block coals of the better grade continue at from $1.25 to $2, those operators who are holding out for the top prices not selling as much as the others. Nut and slack range from 25 to 40 and from 50 to 60c. f.o.b. mines, according to grade.

BIRMINGHAM

Coal market improving and operations are much better.

Keeping pace with the improving iron market, the coal business in this district is in better shape now than it has been for at least twelve months. Indications point toward the last six months in this year showing an increase of at least 50% more than during the first six months. Many of the mines that have been closed down since early last fall have resumed. Orders are coming in better, and for larger tonnages, both on steam and domestic coal; as several of the furnaces in the district which have been out of blast for nearly a year are resuming operations, and the mines are running on an average of 4 to 5 days per week, with a few of them making six days. General conditions in iron and other products are better in every way, and conditions are apparently becoming normal.

COKE

CONNELLSVILLE

Small slump in prompt furnace. Market generally quiet. Wilpen coke works to resume. Production and shipments slightly decreased.

The coke market has been disturbed by a conjunction of unfavorable elements affecting the spot situation. Five or six consumers gave instructions for shipments to be curtailed on their contracts, just at a time when production by merchant ovens had been increased in expectation of heavier demand in the near future. As a consequence prices for spot furnace coke broke, and there have been free offerings at $1.60 while it is quite possible that an even lower figure could be done. The situation is tending to right itself as some ovens were put out last week. The recently advanced quotations on contract have not been realized, as demand on contract has been light, and some operators are ready to quote slightly less. The market stands as follows: Prompt furnace, $1.60; third-quarter furnace, $1.75; contract furnace to June 1, $1.85@2; prompt foundry, $2.20@2.40; contract foundry, $2.25@2.60, per net ton at ovens.

The Shenango Furnace Co. is about to blow in an additional furnace at Sharpsville and will start its Wilpen coke works, in the Upper Connellsville or Ligonier district, containing 150 ovens. The plant has been shipping coal for export and will continue to do so.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended July 24 at 367,-0[illegible] tons, a decrease of 4049 tons, and shipments at 360,852 tons, a decrease of 4763 tons.

Buffalo—The demand is much better than formerly and though it does not increase materially it appears likely to hold particularly as the Lackawanna Steel Co. reports orders three months in advance and increasing. Ore movements by Lake are active. All reports from the coke-oven district agree that the output is now large, though it is feared that too many ovens will be put into operation before the market steadies down. Prices are strong on the basis of $4.25 for best Connellsville foundry and $3.30 for stock coke.

Chicago—Domestic sizes have been in better demand during the past week, with prices a little stronger. The general tone of furnace and foundry coke is steady. Quotations are as follows: Byproduct, $4.65@5.10; Connellsville, $4.75; Wise County, $4.65@4.75; gas coke, $3.75@3.90, furnace, $4.85.

MIDDLE WESTERN

GENERAL REVIEW

Sales slightly larger and prices a trifle stiffer. Domestic shipments increased. Screenings softer. Smokeless coals strong. Anthracite dull.

There has been no evidence of a heavier movement, and it is difficult among the conflicting reports to obtain a correct perspective of the immediate future. The production of coarse coal is increasing so that there are more screenings thrown on the market than can be readily absorbed. City retail yards are still buying sparingly, and the increased shipments have mostly gone into the country districts for threshing purposes. Several contracts have been placed by local retailers during the last week, with deliveries to be made later in the season.

The general opinion is that production has been speeded up ahead of the demand. The movement of tonnage in July did not come up to expectations. Illinois screenings are quoted as low as 60c. with Indiana Fifth and Sixth Vein at 65c., Fourth Vein at 80c., and it is felt that the decline has not been checked. The industrial demand grows very slowly, and evidently there are not enough orders from this source to absorb production of steam coals. Lake shipments are slowly increasing, but the tonnage moved is falling considerably behind previous seasons and there are little hopes for any material improvement until the latter part of the current month at least.

CHICAGO

Market hesitating due partially to uncertainty of crops. Prices generally well maintained. Several new advances in circulars Aug. 1. Higher anthracite freights to Western points.

Shipments to Northwestern points from Southern Illinois mines are being somewhat retarded on account of wet weather. The dealers do not wish to accept threshing coal until they are sure as to the result of the wheat crop, and many things can happen to prevent a large yield. Prices in the Northwestern markets range at circular quotations, or very close thereto.

The summer business in the Peoria district both from the retailer's and operator's standpoint has been very satisfactory so far; prices have been well held, and the larger industrial establishments have been running full time.

Southern Illinois screenings have been on the down grade but it is reported that $1.60 will be the minimum price on domestic lump this month. The demand for Harrisburg lump has been quiet, and steam lump from these mines has been moving very slowly. All Carterville coals have been in steady demand with prices well maintained.

In the Springfield district, domestic lump has been quiet with a steady demand for screenings at closer to list prices than for several weeks past.

The demand for Indiana domestic coals shows an improvement, but steam grades are moving unusually slow. Screenings from Third, Fourth and Fifth Vein mines in the Clinton and Knox County districts have been moving more briskly at fair prices, while there has been an accumulation of fine coal at Fifth and Sixth Vein mines in Sullivan County, and even at reduced prices screenings from these mines have been slow sale.

Smokeless products are very firm. On July 25 several large producing companies put the August schedule of $2.25 for lump and egg into effect. This new schedule has toned up the market for these grades and resulted in some orders before it became effective.

Pennsylvania smokeless prepared sizes, with the exception of egg, are in better demand at improved prices. Mine-run is quiet, and egg size is very slow.

Orders for Hocking domestic lump are coming in more freely, and jobbers report a better demand for all sizes in eastern Indiana and Ohio. Prices on 2- and 3-in. lump average between $1.35 and $1.60, with $1.25 to $1.50 for 1¼-in.

Prices for Kentucky coals are still uncertain. The demand for block is very light, and all other sizes seem to be sold at any price to make a sale.

An advance of 25c. per gross ton occurred in the through rates on anthracite to Western points on July 17, and what effect this will have on future prices is questionable. There has been no rush of orders at the end of the month, and it looks as though the dealers have postponed most of their buying for another month. It is felt that the higher rates will mean an advance in the cost of coal delivered at Western points.

Quotations in the Chicago market are as follows:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.35@1.50	$1.35@1.50	$1.35@1.50	$1.35@1.55	$1.40@1.50
Steam lump	....	1.15@1.25	1.10@1.15	1.10@1.20	....
2½-in. lump	....	....	1.25@1.35	1.15@1.25	1.25@1.35
1¼-in. lump	....	....	1.15@1.20	1.10@1.20	....
Egg	1.35@1.50	1.25@1.35	1.10@1.25	1.15@1.25	1.25@1.35
Nut	1.25@1.35	1.15@1.25	1.00@1.05	.95@1.05	1.15@1.25
No. 1 washed	1.50	....	1.45@1.50	....	....
No. 2 washed	1.40	....	1.35@1.40	....	....
No. 1 nut	1.50	....	....	....	....
No. 2 nut	1.35	....	....	....	....
Mine-run	1.10@1.15	1.00@1.10	.85@1.00	.90@1.00	.85@1.10
Screenings	.70@ .75	.65@ .75	.60@ .75	.65@ .80	.70@ .80

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.35@1.50	$1.25@1.90	2.00@2.10	$1.65@1.90	$1.35@1.60
1¼-in. lump	1.15@1.25	1.25@1.40	....	....	1.25@1.35
Egg	1.35	1.25@1.45	2.00@2.10	1.50@1.75	1.10@1.25
Nut	1.25	1.10@1.35	1.50@1.75	1.25@1.35	1.00@1.10
No. 1 nut	1.35@1.50	....	....	....	....
No. 2 nut	1.35	....	....	....	....
Mine-run	1.10	.90@1.15	1.25@1.35	1.10@1.25	1.00@1.05
Screenings	70@ .75	.45@ .70	..	....	....

Receipts by Lake—Arrivals by Lake for the week to Aug. 3 and for the month and season to date were as follows:

	1915		1914	
From	Anthracite	Bituminous	Anthracite	Bituminous
Buffalo	9,000	.....	14,259	.....
Toledo	.....	9,005	.....	5,300
Ashtabula	.....	.....	7,200	.....
Cleveland	.....	7,981	.....	6,751
Oswego	.....	.....	4,574	.....
Erie	7,000	.....	.....	.....
Conneaut	.....	10,005	.....	.....
	16,000	26,991	39,378	12,061
August total to date	....	9,005	20,546	5,300
Season total to date	379,399	236,235	322,258	341,608

RECAPITULATION FOR THE MONTH OF JULY

	1915		1914	
From	Hard	Soft	Hard	Soft
Buffalo	73,123	.....	93,277	14,560
Oswego	15,571	.....	16,120	.....
Ashtabula	12,844	2,400	14,400	.....
Cleveland	.....	26,094	.....	6,761
Toledo	.....	25,161	.....	38,160
Sandusky	.....	.....	.....	20,411
Erie	19,615	.....	6,662	.....
Conneaut	.....	10,005	.....	.....
Totals	121,153	63,660	130,459	79,892

ST. LOUIS

Increased circulars became effective Aug. 1. Market otherwise dull. Consumers not stocking as much as normally.

August brought with it a marked advance in Williamson and Franklin county prices, with the latter the highest, and there are also changes in the quotations in other fields. Screenings remain low and the market is dull. Domestic orders are not coming in as well as is usual at this time. Householders are putting off as long as possible the laying in of the winter's fuel. It is expected that this will cause a congestion of orders and an advance in prices about Sept. 1.

The quotations on the first of the month were:

	Wilm. & Frnk. Co.	Sparta	Mt. Olive	Standard
6-in. lump	$1.35@1.50	$1.25	$1.35	$1.05
2-in. lump	.....	1.00	1.25	.95
3-in. lump	.....	....	1.25	....
3x6 egg	1.35@1.50	....	....	.90
No. 1 nut	1.35@1.60	....	....	....
No. 2 nut	1.40	....	....	....
No. 1 washed	1.50	....	1.50	....
No. 2 washed	1.25	....	....	....
No. 3 washed	1.35	....	....	....
No. 4 washed	1.35	....	....	....
No. 5 washed	.80	....	....	....
Screenings	.60@ .65	.65	....	.60

INDIANAPOLIS

The fall demand on the Indiana block fields has begun and mines are going on full time one after another. Situation and prices unchanged in the main fields. Retail movement good for the season.

The chief change in the local market has been the picking up of business in the Brazil block fields. Unlike other Indiana coal this may be stored and the movement to the Northwestern states has begun. The mines in this district will all soon be working good.

In the other districts, conditions are little changed though an improvement seems imminent. Railroads are busy getting their equipment ready for the crop movement, which is late on account of unfavorable weather. These preparations seem to be on a large scale, for crops are large though the quality is not the highest. The demand at Chicago has not improved. Indianapolis retail yards are moving considerable quantities of Eastern coals into consumers' bins. Prices generally are unchanged. Screenings, which turned easier the latter part of July, hold firm against any further softening.

KANSAS CITY

Wholesale market shows a slight activity but retail continues heavy.

There has been no change in the retail market during the past week. Prices are the same and if anything the demand has decreased. The wholesale market has shown a little more activity and the number of contracts being let has caused not a little excitement in the coal circles. A great many of the operators and companies are advertising coal in the daily papers and advertising the purchasing of the year's supply now.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN

Destination of shipments over this road for June of this year, the six months of this year and last year were as follows, in short tons:

	June		Six Months	
Coal	1914	1915	1914	1915
Tidewater, foreign	160,300	529,509	922,045	1,668,275
Tidewater, coastwise	310,125	291,891	1,962,226	1,606,181
Domestic	1,845,531	1,891,877	9,632,050	9,486,697
Coke				
Tidewater, foreign	.....	7,572	15	16,136
Domestic	87,921	69,956	580,653	428,158
Total	2,403,877	2,790,805	13,096,989	13,205,447

ILLINOIS AND INDIANA RAILROAD TONNAGES

Shipments of coal originating from Illinois and Indiana mines during June were as follows in net tons:

Illinois Central R.R.	480,490	B. & O. S. W. R.R.	57,191
C. & E. I. R.R.	370,284	St. L. T. & E. R.R.	35,572
C. B. & Q. R.R.	350,527	C. & N. W. Ry.	31,787
C. C. C. & St. L. Ry.	332,940	C. P. & St. L. R.R.	26,414
Vandalia R.R.	326,268	L. & N. R.R.	19,009
C. T. H. & S. E. Ry.	203,071	L. & M. Ry.	17,956
Chicago & Alton R.R.	138,619	M. & O. R.R.	15,219
St. L. I. M. & S. Ry.	115,806	S. L. & B. E. Ry.	13,047
Wabash R.R.	100,412	T. St. L. & W. R.R.	11,651
C. I. & L. Ry.	61,332		

FOREIGN MARKETS

GREAT BRITAIN

July 23—The strike having been settled, work has been generally resumed at all the pits. Business is on very quiet lines at present. The market is unsettled and there are prospects that it will remain so until about the early part of August. The following are the nominal quotations:

Best Welsh steam	Nominal	Best Monmouthshires	$6.00@6.24
Best seconds	Nominal	Seconds	5.76@6.00
Seconds	$6.24@6.48	Best Cardiff smalls	5.16@5.40
Best dry coals	6.00@6.48	Cargo smalls	4.08@4.32

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering, while a little more active, continues on limited lines because of the difficulties following the miners' strike. Tonnage for prompt positions is offering abundantly. Rates are nominally as follows:

Gibraltar	$3.84	Naples	$4.80	St. Vincent	$5.32
Marseilles	3.81	Alexandria	5.52	Rio de Janeiro	6.24
Algiers	3.48	Port Said	5.28	Monte Video	5.76
Genoa	4.80	Las Palmas	4.08	River Plate	6.00

Later—Cable reports under date of Aug. 3 state that Great Britain will place a rigid embargo against coal exports of any kind to other than British possessions and protectorates. The embargo will become effective Aug. 30. Several months ago an embargo was declared against foreign shipments to other than British possessions, protectorates, and her allies in the war, but apparently even these latter are now to be excluded from obtaining the British product.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

+Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared.

No.	Purchaser	City	State	Tonnage	Page
1010	Kansas City Soap Co.	Kansas City	Mo.		198
1054	Board of Education	Ottumwa	Iowa	1600b	157
1059	Bd. of County Comrs.	Toledo	Ohio		116
1149	Custer County	Broken Bow	Neb.		199
1152	Sch. Bd. Harmony Dist.	Minot	N. D.		199
1158	Belmont Count	St. Clairsville	Ohio		199
1159	Board of Education	Plains	Penn.		199

a Indicates anthracite coal. b Indicates bituminous.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

+No. 821—Cranston, R. I.—This contract (Vol. 7, p. 1049), which provides for furnishing this city with approximately 1000 tons of egg coal, was bid on by both the Eastern Coal Co. and the R. E. Smith Co. at $6.36 per ton. No announcement of the award has yet been received. Address Deputy City Clk. L. A. Smith, Jr., City Hall, Cranston, R. I.

1007—New Castle, Penn.—Bids on this contract (p. 77), were received until 8 p.m., Aug. 6. Address Secy. H. M. Marquis, North & East St., New Castle, Penn.

1012—Pleasant Hill, Mo.—This contract (p. 77), which provides for furnishing the George M. Kellogg Co. with about 20 cars of slack coal per month, will probably be let about Aug. 15. Address Pur. Agt. N. F. Parker, George M. Kellogg Co., Pleasant Hill, Mo.

1022—Chicago, Ill.—It is understood that the question of awarding this contract (p. 77), which provides for furnishing the Municipal Tuberculosis Sanitarium with coal will be taken up at the next meeting of the Board which is scheduled to be held about Aug. 10. Address Board of Directors, Municipal Tuberculosis Sanitarium, North Crawford and Peterson Ave., Chicago, Ill.

1034—Youngstown, Ohio—Bids on this contract (p. 115), which provides for furnishing the Board of Education with approximately 5000 tons of coal will be received until noon, Aug. 15. Deliveries are to be made as required and each bid must be accompanied by a certified check for $500. Address Dir. W. N. Ashbaugh, Bd. of Edu., School Dist., 20 W. Wood St., Youngstown, Ohio.

1068—New York, N. Y.—This contract (p. 117), which provides for furnishing the Dept. of Docks and Ferries with 3000 tons of egg coal was bid on as follows: Streat Coal Co., $5.94; Pattison & Bowns, $5.37; Gavin Rowe, $5.46; W. P. W. Haff, $5.57. Address Dock Comr. R. A. C. Smith, Pier A, North River, New York.

1151—New York, N. Y.—Bids on this contract (p. 199) calling for furnishing and delivering 17,775 tons of buckwheat No. 3 and 5925 tons of mine-run for use in certain school buildings were as follows:

	Manhattan		Bronx	
	Buck. No. 3	Mine-Run	Buck. No. 3	Mine-Run
Tons	8250	2750	3600	1200
Burns Bros.	$3.04	$2.93	$3.14	$4.03
Wm. Farrell & Son	3.39	4.23	....	.....
C. D. Norton & Co.	2.98	3.73	3.23	4.03

Norton & Co. offered a rebate of one cent per ton if the city furnished dock facilities free of charge.

	Brooklyn		Queens	
	Buck. No. 3	Mine-Run	Buck. No. 3	Mine-Run
Tons	4950	1650	975	325
Gavin Rowe	$3.37	$4.12	$3.47	$4.22
C. H. Reynolds & Son	2.60	3.58	2.70	3.68
S. Tuttle's Sons & Co.	2.94	4.04	3.23	4.18
Bacon Coal Co.	2.76	3.81	3.11	4.16
A. J. & J. J. McCollum	2.90	3.73	3.20	4.05
W. P. W. Haff	3.11	3.71	....	.....

Rowe offered a rebate of one cent per ton if dock facilities were furnished by the city free of charge. The period of delivery will be from August 16, 1915 to March 31, 1916. Address Supt. of Supplies, Patrick Jones, Board of Education, 59th St. and Park Ave., New York City

New Business

1168—Kansas City, Mo.—The Kansas City Veterinary College will contract for approximately 100 tons of mill-run and nut coal on Sept. 1. Address Business Mgr. Dr. T. J. Stewart, 15th St. and Lydia Ave., Kansas City, Mo.

1169—Kansas City, Kan.—Frank G. Kinney & Co. will contract about Sept. 1 for 500 tons of bituminous coal, deliveries to be made during the ensuing year. Address Frank G. Kinney, 17th St. and Osage Ave., Kansas City, Kan.

1170—Louisville, Ky.—The Starks Realty Co. at this place will contract about Sept. 1 for approximately 1100 tons of nut and slack coal. Deliveries are to be made by wagon and as required during the ensuing year. Address Purchasing Agent, Starks Realty Co., Starks Bldg., Louisville, Ky.

1171—Independence, Mo.—The Municipal Light Department at this place will be in the market about Sept. 1 for its annual requirements of coal, involving approximately two cars per month. Slack coal is used chiefly, though some lump is required. Address City Clerk, Independence, Mo.

1172—Chicago, Ill.—The Audebert Wall Paper Mills will be in the market about Sept. 1 for its annual requirements of coal. Approximately one car per week of Illinois or Indiana No. 2 nut and one car of Illinois screenings are required. Address Purchasing Agent, Audebert Wall Paper Mills, Chicago, Ill.

1173—Kansas City, Kan.—Peet Bros. Soap Co. will contract about Sept. 1 for its annual requirements of coal. It consumes approximately one car per day of slack. Address N. N. Dalton, Peet Bros. Soap Co., 15th St. and Kansas Ave., Kansas City, Kan.

+1174—Canton, Ohio—The Board of Education at this place contracts about Sept. 1 of each year for its annual requirements of coal, involving approximately 2800 tons of Pittsburgh No. 8. The current contract is being filled at $2.42 per ton. The business is let on a competitive basis. Address Board of Education, Canton, Ohio.

1175—Kansas City, Mo.—The American Radiator Co. at this place will let its annual requirement for coal, involving approximately 12 cars of slack or mill-run, about Sept. 1. Address Purchasing Agent, American Radiator Co., Kansas City, Mo.

+1176—Topeka, Kan.—The Board of Education at this place usually contracts about Sept. - for its annual requirements of coal. The present contract is being filled on the following basis: Nut, 1694 tons at $3.25; slack, 129 tons at $2.70; lump, 176 tons at $3.60. The call for bids is advertised and business is let on a competitive basis. Address Board of Education, Topeka, Kan.

1177—Kansas City, Mo.—The Keeley Institute at this place will contract about Sept. 1 for approximately 100 tons of Cherokee lump coal. Address Mgr. C. W. Wadsworth, the Keeley Institute, 31st and Euclid St., Kansas City, Mo.

+1178—Cumberland, Md.—The Board of Education will contract some time in September for about 200 tons of big vein Cumberland coal. The current contract is being filled at about $2.25 per ton. Address Board of Trustees, Board of Education, Cumberland, Md.

1179—Kansas City, Mo.—The Kansas City Terminal Co., which operates the Union Station, passenger and freight terminals, will let its annual fuel contract for the coming year about Sept. 1. Advices will be sent out some time during August. The company requires about 100 tons of slack coal

per day. Address Pur. Agt. A. J. Stewart, Kansas City Terminal Co., Union Station, Kansas City, Mo.

✚**1180—Columbia, Mo.**—The Water and Light Department at this place will contract about Sept. 1 for its annual fuel requirements, aggregating about 8000 tons of washed slack, Nos. 3, 4 and 5 grades. The business is done on a competitive basis and the approximate cost is $2.25 per ton. Address Chf. Engr. M. E. Fawks, Water and Light Dept., Columbia, Mo.

1181—Kansas City, Mo.—The Prior Brass Manufacturing Co. will let its annual coal contract, amounting to approximately one car of bituminous a month, on Sept. 1. Address Mgr. Walter H. Prier, Prier Brass Mfg. Co., Kansas City, Mo.

1182—St. Louis, Mo.—The Cupples Station Light, Heat & Power Co. will let its annual coal contract, involving approximately 25,000 tons of screenings, about Sept. 1. About 1½-in. or 2-in. grade suitable for chain-grate stokers is required. Address Pres. H. Wurdock, Cupples Station Light, Heat & Power Co., 750 Railway Exchange Bldg., St. Louis, Mo.

1183—Middletown, Ohio—The American Rolling Mill Co. consumes about 100,000 tons of mine-run steam coal and 50,000 tons of gas per annum, and contracts when the market seems most favorable. Deliveries are made by rail, and they have practically unlimited storage capacity. Address Pur. Agt. H. O. Miller, the American Rolling Mill Co., Middletown, Ohio.

✚**1184—Roaring Spring, Penn.**—The school board of this borough received bids until Aug. 2 for furnishing and delivering 100 tons of good steam coal. Address Secy. F. K. Lorenz, Roaring Spring School Bd., Roaring Spring, Penn.

✚**1185—Millersburg, Ohio**—The local Board of Education received sealed bids until 2 p.m., Aug. 2, for furnishing and delivering coal as required at the local school houses in Monroe township during the ensuing year. Address Clk. J. J. Hart, Millersburg, Holmes County, Ohio.

✚**1186—Ponca, Neb.**—The County Government will receive bids until Aug. 10 for furnishing one carload of anthracite egg coal. Address County Clk. A. N. Porter, Ponca, Dixon County, Neb.

✚**1187—Scottdale, Penn.**—The school board of Upper Tyrone township received sealed bids until Aug. 2 for furnishing mine-run coal as required at the school buildings during the ensuing year. Address Secy. Jos. Weaver, Upper Tyrone School Board, Scottdale, Penn.

✚**1188—Agosta, Ohio**—The Board of Education of the New Bloomington School district will receive bids for furnishing the coming year's supply of coal. White ash coal is preferred, and quotations may be either on track at Agosta, or in bin. Address Clk. J. W. Haruff, Bd. of New Bloomington Village School District, Agosta, Ohio.

✚**1189—McKeesport, Penn.**—The Versailles township school board received sealed bids until Aug. 5 for furnishing their coal requirements during the ensuing year. Address Ben Dulany, 2514 Fifth Ave., McKeesport, Penn.

✚**1190—Forest, Ohio**—The Jackson township board of education received sealed bids until Aug. 2 for furnishing the coal requirements of the different schools. Address, Clk. E. C. Condon, Forest, R. F. D. 4, Wyandot Co., Ohio.

✚**1191—Sharpsburg, Penn.**—The Board of Education will receive sealed bids until 5 p.m., Aug. 7, for furnishing and delivering to the various school buildings coal as may be required during the ensuing year. Bids are requested on Cornell and Mansfield, forked coal and slack. Address Chn. of Supply Com. P. H. Young, Bd. of Edu., Sharpsburg, Penn.

✚**1192—New Brunswick, N. J.**—The City Commissioners will receive sealed bids until 10 a.m., Aug. 13, for furnishing approximately 900 tons of No. 1 Logan bituminous coal. The coal is to be delivered at the pumping station at Weston's Mills, at the rate of about 100 tons a month, beginning August, deliveries to be completed the following April. A certified check for 5% of the total amount of the proposal is to accompany all bids. Address: Dir. Edw. F. Farrington, Dept. of Pub. Affairs, New Brunswick, N. J.

✚**1193—Turtle Creek, Penn.**—The township school board will receive bids until 2:30 p.m., Aug. 7, for furnishing No. 1 lump and slack coal as may be required during the ensuing year. Address Secy. Wm. E. Taylor, Turtle Creek, Penn.

✚**1194—McConnellsville, Ohio**—The Board of Education of Bloom township will receive bids until 1 p.m., Aug. 14, for furnishing coal to the schools throughout the district. Address Clk. Chas. R. Henderson, Bd. of Edu., McConnellsville, Ohio.

✚**1195—Green Bay, Wis.**—Sealed proposals were received until 11 a.m., July 30, for furnishing the Brown County Asylum with 600 tons of pile-run, bituminous coal, quotations to be f.o.b. Smith's Spur. Deliveries are to be made during the ensuing year. Address Jos. H. Servotte, Board of Trustees, Brown County Asylum, Green Bay, Wis.

✚**1196—Connellsville, Penn.**—The Dunbar township school board will receive bids until noon, Aug. 14, for furnishing and delivering coal as may be required at the different buildings during the ensuing year. Address, Secy. F. C. Smith, Bd. of Edu., Dunbar Township School Bd., Dunbar, Penn.

1197—Louisville, Ky.—The Dow Wire & Iron Works at this place usually contracts for their fuel requirements some time during the current month. They use about 1500 tons of West Kentucky 1¼-in. pea and slack coal a year. Deliveries are made at the rate of three cars per month by the Louisville & Nashville R.R. and their storage capacity is 40 tons. Address Pur. Agt. R. S. Carson, Dow Wire & Iron Works, Louisville, Ky.

✚**1198—Columbus, Ohio**—The Ohio Board of Administration will contract about Aug. 20 for the coal required at 18 different charitable institutions, involving approximately 20,000 tons of coal. It will be a condition of the contract that the coal must be produced in Ohio. Address T. E. Davey, Ohio Bd. of Administration, Columbus, Ohio.

✚**1199—Chattanooga, Tenn.**—The city government will receive sealed bids until noon, Aug. 10, for furnishing and delivering approximately 1800 tons of coal to the different fire halls, school buildings and other buildings of the city government. All bidders must submit an analysis of the coal they propose furnishing. Blank forms and other information can be obtained on application. Address Com. E. D. Herron, Dept. of Pub. Utilities, Grounds and Buildings, Chattanooga, Tenn.

✚**1200—Cincinnati, Ohio**—The Public Service Department will receive bids until noon, Aug. 12, for furnishing and delivering coal to the Main Pumping Station, Western Hills Pumping Station and Filtration Plant of the Cincinnati Water Works Department. All bids must be accompanied by bond or certified check for $500, and must be submitted on blank forms which may be obtained on application. Address Secy. Parke S. Johnson, Pub. Service, City Hall, Cincinnati, Ohio.

✚**1201—Bay City, Mich.**—The City Government received sealed bids until 3 p.m., Aug. 5, for furnishing and delivering coal as follows: City Hall, 450 tons of steam lump; City Detention Hospital, 60 tons same; Fire Department, 30 tons of various grades of anthracite coal and 30 tons of bituminous. Address City Compt. E. E. Prohazke, City Hall, Bay City, Mich.

✚**1202—Circleville, Ohio**—The Board of Education of Jackson Township will receive separate bids until 1 p.m., Aug. 13, for furnishing and delivering approximately 1800 bu. of coal required at the school building during the ensuing year. Bids for delivering the coal should be made on the basis of 100 bu. Address Clk. Charles M. Niles, R. F. D. No. 5, Circleville, Ohio.

✚**1203—Washington, D. C.**—The Commissioner of Fisheries will receive sealed bids until Sept. 1 for furnishing 825 tons of anthracite coal for delivery as follows: Woods Hole, Mass., 500 tons; Gloucester, Mass., 150 tons; Boothbay Harbor, Me., 175 tons. Blank proposal forms and further particulars may be had on application. Address Commissioner of Fisheries, Washington, D. C.

✚**1204—Ritzville, Wash.**—The Commissioners of Adams County will receive sealed bids until 1 p.m., Sept. 2 for furnishing and delivering coal to the Court House as required in carload lots. Certified check for 5% of the cost of one car of coal must be submitted with each bid. Address Clk. J. L. Cross, Bd. of County Comrs., Ritzville, Wash.

✚**1205—Uhrichsville, Ohio**—The Board of Education will receive sealed bids until Sept. 1 for furnishing screened coal required at the school during the ensuing year. Address E. E. Roch, Bd. of Edu., Uhrichsville, Ohio.

✚**1206—Sawyer, N. D.**—Sealed bids will be received until 2 p.m., Aug. 16, for furnishing and delivering 100 tons of coal to the local district. Deliveries are to begin Sept. 1 and to be completed by Jan. 1. Address Dist. Clk. E. D. Skinner, Sawyer, N. D.

✚**1207—Cloquet, Minn.**—The Board of Education will receive sealed bids until 4 p.m., Aug. 7, for furnishing and delivering 500 tons of Pocahontas screened lump coal to the various school buildings as required during the ensuing year. Address Dist. Clk. L. F. Leach, Bd. of Edu., Cloquet, Minn.

1208—Kansas City, Mo.—The Evans-Smith Drug Co. at this place will contract some time during the current month for approximately 100 tons of bituminous coal. Cherokee nut coal is preferred. Address Purchasing Agent, Evans-Smith Drug Co., Kansas City, Mo.

✚**1209—Wahpeton, N. D.**—The Richland County Commissioners will receive sealed bids until 2 p.m., Sept. 1, for

furnishing approximately 300 tons of Pocahontas mine-run coal. Bids are to include cost of delivery to the Court House. Address County Audr. F. A. Burton, Wahpeton, N. D.

+1210—Buffalo, Minn.—The County Government will receive bids until 2 p.m., Aug. 17, for furnishing 100 tons of Youghiogheny screened lump coal, 60 tons of which are to be delivered at the Court House, and the balance to be f.o.b. side track at this place. Address County Aud. John A. Berg, Buffalo, Minn.

+1211—Cando, N. D.—The Badger School Dist. No. 2 will receive sealed bids until Aug. 10, for furnishing and delivering approximately 200 tons of screened Pocahontas egg coal as required. Address Clk. H. D. Skinner, Badger School Dist. No. 2, Cando, N. D.

1212—Kansas City, Mo.—The Nafziger Baking Co. will contract for their coal supply involving about 40 tons of semi-anthracite per month some time during the current month. Address Purchasing Agent, Nafziger Baking Co., 711 Virginia Ave., Kansas City, Mo.

1213—Ft. Wayne, Ind.—Sealed bids will be received at the Indiana School for Feeble Minded Youth until 9 a.m. Aug. 10, for furnishing coal and coke during the ensuing year as follows: 150 tons of egg-sized coke, to be delivered in the bins as required; 500 tons semismokeless washed egg coal and 500 tons mine-run Pocahontas, all to be delivered during the current month; 800 tons of bituminous three-quarter lump, mine-run, nut, pea and slack or coarse slack. Bidders must give prices on each grade, together with the location of the mine and the B.t.u. value of the coal which they are willing to guarantee. Analysis must also be submitted. Prices are to be f.o.b. Ft. Wayne, Ind., L. S. & M. S. delivery. Coal is to be shipped as required. Address Supt. Dr. Geo. S. Bliss, Indiana School for Feeble Minded Youth, Ft. Wayne, Ind.

+1214—Dayton, Iowa—The Independent School District of Dayton will receive bids until 8 p.m. Aug. 11 for furnishing coal required during the ensuing year. Specifications and particulars may be had on application. Address Secy. O. S. Larson, Independent District of Dayton, Dayton, Iowa.

+1215—Springfield, Ohio—The City Government will receive bids until Aug. 13 for furnishing the annual coal supply for the local pumping station. Address City Mgr. Ashburner, Springfield, Ohio.

1216—Kansas City, Mo.—The Carnie-Goudie Manufacturing Co. will be in the market some time in the near future for five cars of Cherokee lump. Address Purchasing Agent, Carnie-Goudie Manufacturing Co., 1014 Wayandotte St., Kansas City, Mo.

+1217—Eau Claire, Wis.—The City Government will receive sealed bids until 9 a.m. Aug. 7, for furnishing 150 tons of screened coal to be delivered f.o.b. cars on side tracks between Sept. 1 of this year and July 1, 1916. Bids are requested on Hocking Valley, West Virginia splint, and screened Youghiogheny. Address County Clk. John H. Nygaard, Eau Claire, Wis.

+1218—Mott, N. D.—The Mott School District received bids until 6 p.m. Aug. 3, for furnishing approximately 250 tons of lignite coal for use during the ensuing year. Address Clk. R. E. Trousdale, Mott School District, Mott, N. D.

+1219—Cedar Falls, Iowa—Sealed bids will be received by the Cedar Falls Water and Light Department until 7:30 p.m. Aug. 9 for furnishing approximately 3000 tons of coal during the year beginning Sept. 1. Bids are requested on 1½- and 2-in. Franklin County, Illinois, screenings and should be made f.o.b. side track on the C. G. W. Ry., at the water-works plant. Address Mayor J. B. Newman, Cedar Falls Water & Light Plant, Cedar Falls, Iowa.

+1220—Knoxville, Tenn.—Bids were received until noon Aug. 3 for furnishing 2x4-in. round coal for the Knox County court house and jail. Deliveries are to be made in bins in carload lots as required. Address County Judge R. A. Brown, Court House, Knoxville, Tenn.

1221—Kansas City, Mo.—The Schulze Baking Co. at this place will receive bids for furnishing 12 to 15 tons of semi-anthracite per month. Address Purchasing Agent, The Schulze Baking Co., 2130 Campbell St., Kansas City, Mo.

+1222—Regent, N. D.—The Regent School District will receive bids until noon Aug. 10 for furnishing a good grade of lignite coal to be delivered in the bins of the local school building during the ensuing year. Address Clk. F. L. Schnebly, Regent School District No. 14, Regent, N. D.

+1223—Missoula, Mont.—The Board of School Trustees for District No. 1 will receive bids until 8 p.m. Aug. 24, for furnishing approximately 500 tons of coal to be delivered at the local school buildings as required. Address Clk. M. R. Hardenburgh, School District No. 1, Missoula, Mont.

+1224—Boston, Mass.—The Massachusetts Training Schools will receive bids until 2 p.m. Aug. 11, for furnishing semi-bituminous steaming coal to the state institutions as follows: Lyman School for Boys, 1200 to 1500 tons; Industrial School for Boys, 300 tons; Industrial School for Girls, 300 to 400 tons. Bids must be submitted on blank forms which may be obtained on application, and a certified check for 4% of the estimated amount of the contract must accompany each bid. Address Executive Secy. F. Leslie Hayford, Massachusetts Training Schools, 274 Boylston St., Boston, Mass.

+1225—Easton, Penn.—W. S. Barstow & Co., controlling the General Gas & Electric Co., announce that they are in the market for 250,000 tons of slack coal for delivery at Easton, Penn., and neighboring properties; also 15,000 tons for delivery at Binghamton, New York. Address General Pur. Agt. F. C. Rose, 50 Pine St., New York, N. Y.

+1226—Martinsburg, Penn.—The Huston Township Board of Education will receive bids until 2 p.m., Aug. 7, for furnishing the coal required at the school buildings during the ensuing year. Sonman screened coal is required. Address, Secy. E. W. Smith, Bd. of Edu., Houston Township, Martinsburg, Penn.

+1227—Coalport, Penn.—The school board at this place will receive bids until noon Aug. 9 for furnishhing coal required at the local buildings during the ensuing year. Address, Secy. P. C. Gates, Bd. of Edu., Coalport, Penn.

+1228—Johnstown, Penn.—The Board of Education at this place will receive bids until noon Aug. 14, for furnishing its coal requirements during the ensuing year. Mine-run coal is required. Address, Secy. Charles H. Meyer, Bd. of Edu., 601 Swank Bldg., Johnstown, Penn.

+1229—Clearfield, Penn.—The Lawrence Township School Board will receive bids for furnishing the coal required at the different school buildings during the ensuing year, until noon Aug. 14. Address, Secy. Amos Owens, R. F. D. No. 2, Clearfield, Penn.

+1230—Sharpsburg, Penn.—The Board of Education will receive sealed bids until 5 p.m., Aug. 7, for furnishing the coal required at the various school buildings during the ensuing year. Bids are requested on Cornell and Mansfield coal, forked and slack. Address, Chn. P. H. Young, Supply Com., Bd. of Edu., Sharpsburg, Penn.

+1231—Wilkes-Barre, Penn.—The Board of Education at this place will receive sealed bids until 6 p.m., Aug. 12, for furnishing its coal requirements during the ensuing year. Bids for the coal and for delivery should be made separate. Address Secy. W. H. Morris, 58 Lee Park Ave., Hanover Township, Penn.

1232—Martinsburg, Penn.—The school board of North Woodbury township will receive bids until 1 p.m., Aug. 14 for furnishing its coal requirements during the ensuing year. Bids may either be by the ton or for furnishing the entire requirement. Sonman or Latrobe screened coal is required. Address Secy. W. H. Brumbaugh, North Woodbury township School Bd., South Martinsburg school house, South Martinsburg, Penn.

Contracts Awarded

Note—Successful bidders are noted in **bold face** type.

No. 363—Toledo, Ohio—This contract (Vol. 7, pp. 566, 955, Vol. 8, p. 200), which provides for furnishing 6000 tons of coal for use at the Broadway pumping station, was awarded to the **M. A. Hanna Co.**, as previously announced, and we are now informed that the consideration was $1.90 per ton for "Boomer" slack of West Virginia. The contract only runs to Jan. 1. Address Supt. P. R. Cook, Water Works Dept., Toledo, Ohio.

No. 702—Peru, Ind.—This contract (Vol. 7, p. 877), which provides for furnishing the city power plant at this place with approximately 6000 tons of coal, has been awarded to the **Wyatt Coal Co.**, of Charleston, W. Va., at 87c. per ton, which is 10c. under the figure of last year. Address Mgr. Arthur Herren, Electric Light & Water Co., Peru, Ind.

No. 837—Fulton, Mo.—This contract (Vol. 7 p. 1049), which provides for furnishing the local Water, Light & Power Plant at this place with approximately 4000 tons of bituminous coal, has been awarded to the **Harris Trigg Coal Co.**, at $2.24 for mine-run and $2.37 for screen coal. Address Supt. W. J. McCarroll, Municipal Water, Light and Power Plant, Fulton, Mo.

No. 853—Boise, Idaho—This contract (Vol. 7, p. 1085), which provides for furnishing the Idaho State Board of Education with approximately 4500 tons of coal during the ensuing school year, has been awarded as follows: Industrial Training School, **Kemmerer Coal Co.**, mine-run, $4.25; screened slack, $3.50. Deaf and Blind School, **Gooding Milling & Elevator Co.**,

Hiawatha lump, $6.75; mine-run, $6.05. Academy of Idaho, **Finn H. Berg,** Royal lump, $5.30 for delivery prior to Aug. 1 and $5.75 thereafter; Kemmerer No. 5, mine-run, $4.50. University of Idaho, **Madison Lumber & Mill Co.,** Roslyn-Cascade lump, $6.25 and mine-run, $6; special mine-run, $5.70 and special steam, $5.25; Kemmerer No. 5, mine-run, $6.75 and screened slack, $6. Albion Normal School, **Nibley-Channel Lumber Co.,** lump, $9.50 for delivery prior to Aug. 1, $9.75 for delivery prior to Nov. 1, and $10 thereafter; mine-run, $8. Address Aud. and Business Agt. Ralph T. Bickell, State Bd. of Edu., Boise, Idaho.

No. 870—Peoria, Ill.—This contract (Vol. 7, p. 1086, Vol. 8, p. 76), which provides for furnishing the Board of Education with approximately 5000 tons of bituminous coal, has been awarded to **Dooley Bros.,** at $2 per ton, delivered. The contract for the past year was concluded on the basis of $2.50 per ton. Address Secy. Anna Rynearson, Bd. of School Inspectors, Room 203, City Hall, Peoria, Ill.

No. 893—Milwaukee, Wis.—This contract (Vol. 7, p. 1086, Vol. 8, p. 76), has been awarded to all the recommended bidders noted in the previous issue with the following exceptions: Callaway Fuel Co., for delivery of anthracite at Milwaukee, $815; Perry Coal Co., for bituminous deliveries to Sault Ste. Marie, $567; Marinette Fuel & Dock Co., for delivery at Marinette, $1214.25. Address Lighthouse Inspector, Milwaukee, Wis.

No. 922—New Orleans, La.—This contract (Vol. 7, p. 1127, Vol. 8, p. 157), which provides for furnishing the Board of Education with approximately 2000 tons of anthracite and bituminous coal, has been let to **W. G. Coyle & Co.,** on the following basis: Anthracite egg, $8.35; nut and stove, $8.45; bituminous "Sipsey," $3.85. Address Secy. E. A. Williams, Bd. of Edu., 4th floor, Municipal Bldg., New Orleans, La.

✚No. 924—Indianapolis, Ind.—This contract (Vol. 7, p. 1127), which provides for furnishing the fuel requirements of the local Board of Education and for the county poor, has been awarded to the **Commercial Fuel Co.** The bids received including that of the Commercial Co. were as follows:

	No. 4 Linton	No. 6 Buller	Pocahontas
Indianapolis Coal Co.	$2.60	$2.50	$3.60
A. B. Meyer & Co.....	2.75	2.75	3.75
Mortar & Fuel Co.....	2.69	2.69	3.79
Commercial Fuel Co.....	2.58	2.50	3.55

Address Trustee John W. Castor, 317 Saks Bldg., Indianapolis, Ind.

✚No. 927—Shelbyville, Ind.—This contract (Vol. 7, p. 1127), which provides for furnishing the County Court House, Jail, Orphans Home and County Farm with coal during the ensuing year has been awarded to **J. O. Parrish Co.,** at the following prices: Orphans Home, $3.45; County Farm, $2.80; County Jail, $3.55. Address Aud. Frank W. Fagel, County Comr., Shelbyville, Ind.

No. 934—Worcester, Mass.—This contract (Vol. 7, p. 1127, Vol. 8, p. 40), which provides for furnishing the various public buildings with coal during the ensuing year, has been awarded to the **Peoples Coal Co.,** which was the lowest bidder at $4.57 per ton or more. Complete list of bids was given in previous issues. Address Supt. of Pub. Bldgs. George C. Halcott, Room 35, City Hall, Worcester, Mass.

✚No. 935—New York, N. Y.—This contract (Vol. 7, p. 1127, Vol. 8, p. 115), which provides for furnishing the Department of Docks and Ferries with coal, has been awarded to the **Clarksburg Coal Mining Co., Inc.,** at $1.94 per ton. Address Com. of Docks R. A. C. Smith, Pier A, foot of Battery Pl., N. R., New York.

No. 937—Amsterdam, N. Y.—This contract (Vol. 7, p. 1127, Vol. 8, p. 76), which provides for furnishing the local Public Schools with approximately 900 tons of various grades of coal, was bid on by 11 different bidders, and each one was awarded the contract for supplying the coal at one school. Address Clk. Leslie L. Bedd, Bd. of Edu., High School Bldg., Amsterdam, N. Y.

✚No. 947—Towson, Md.—This contract (p. 40), which provides for furnishing the Maryland State Normal School with approximately 800 gross tons of Georges Creek Big Vein coal has been awarded to the **Enterprise Fuel Co.** at $3.29 per gross ton. Address Secy. M. Bates Stephens, State Bd. of Edu., Annapolis, Md.

No. 961—New York, N. Y.—This contract (Vol. 8, p. 41), which provides for furnishing the City College with 4800 tons of No. 3 buckwheat and 1600 tons of semibituminous mine-run, has been awarded to **Charles D. Norton Co.** at $2.33 per ton for the buckwheat and $3.31 for the mine-run. Pattison & Bowns bid $2.49 for buckwheat and $3.41 for the mine-run. Address Curator of the College, Room 114, Main Bldg., 139th St. and Convent Ave., New York City.

Contract Notes

Buffalo, N. Y.—Col. F. G. Ward, Commissioner of Public Works, buys all the coal for the public buildings at this place.

Shelbyville, Ind.—The contract for furnishing the county schools with coal during the ensuing year, has been awarded to the **J. O. Parrish Lumber Co.**

Bismarck, N. D.—The State Board of Control of Penal and Charitable Institutions let the contracts for furnishing coal to the various institutions under its charge.

New Orleans, La.—The Sheffield Steel & Iron Co. has renewed their contract with the **New Orleans Street Ry. Co.** for 200,000 tons of coal for 1916 at an advanced price.

Tipton, Ind.—The County Commissioners awarded their contract for coal for the Court House, Jail and Infirmary to **Joyce & Jarvis,** of Elkin, Ind., at $2.75 a ton for West Virginia nut, f.o.b. Tipton.

Hillsboro, N. D.—The contract for furnishing the local power house with coal during the ensuing year has been awarded to the **Hillsboro Lumber Co.** Address City Audr. N. G. Nyhus, Hillsboro, N. D.

Norfolk, Va.—Seven bids were submitted for furnishing the local Water Department with coal during the ensuing year, the quotations ranging from $3 to $4 per ton for lump, $2.88 to $3 for mine-run and $2.60 to $2.75 for slack.

Port Huron, Mich.—The West Virginia Pocahontas Coal Sales Corporation has the contract for furnishing the local water works department with their fuel requirements. The contract is being filled with Panther 1¾-in. lump coal.

✚Indianapolis, Ind.—Contract of the Artificial Ice & Cold Storage Co. for yard requirements of lump, egg and nut coal, has been placed with the **Consolidated Indiana Coal Co.,** to be shipped in monthly installments. The contract expires Mar. 31, 1916.

New Orleans, La.—The contract for supplying 1200 tons of bituminous coal to the New Orleans Custom House for the fiscal year ending June 30, 1916, was awarded to the **H. P. Hyams Coal Co.,** of this city. The coal was purchased under a B.t.u. guarantee.

The Car Supply—A number of railroads are giving warnings as to car shortages to be expected this fall and winter. Several carriers are taking measures to forestall trouble by increasing their repair forces and placing restrictions in the way of supplying cars, even at this early date.

The Fall Outlook—Talk of slow car movement in the late fall and winter is again heard and the fact that some operators are proceeding cautiously on new business is causing some of the prudent buyers to give it consideration. There is more than a possibility it will be an interesting fall.

New Orleans, La.—The two low bidders on the United States plant coal contract, noted in a previous issue (Vol. 7, p. 1050), the **Tennessee Coal & Iron Co.** and the **R. B. Hyams Coal Co.,** have been awarded the contract. Address United States Engineers Office, Room 325, Custom House, New Orleans, La.

Middle West—The continued encroachment of foreign coals into home territory is causing the Indiana operators much concern, and they are about to inaugurate a campaign of publicity to increase the consumtpion of Indiana coals at home, especially among state and county institutions, the majority of which are now using Eastern coals.

Pawtucket, R. I.—The Lossaine Mfg. Co. at this place consumes about 12,000 tons of New River and buckwheat coal, deliveries being made at the rate of about 100 tons per month by water to Providence, and from there to Pawtucket by rail. The company has a storage capacity of 3000 tons. Address W. W. Jollie, Lossaine Mfg. Co., Pawtucket, R. I.

Knoxville, Tenn.—Press reports are to the effect that the **Southern Coal & Coke Co.** have secured orders aggregating 220,000 tons of coal to be shipped into the Ohio territory. About 40,000 tons of this are said to have been placed with a western railroad, this representing their first purchase of this grade of coal. All of this business was obtained in close competition with Pennsylvania and West Virginia mines. The coal will be distributed from Cincinnati, Dayton and other Ohio and Indiana points.

Springfield, Ill.—The City Government has made the following awards covering municipal coal contracts, and at less prices than of recent years: **Jones & Adams Coal Co.,** 1¼-in screenings for use at electric-light plant, at $1.02½ per ton; same at water-works plant, $1.03½ per ton; **Colvin Coal Co.,** lump coal for city buildings, at $2.30 per ton delivered. The city owns and operates a municipal electric-light plant and water-works, and in addition to this considerable fuel is used for heating various city buildings.